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REPORTS OF THE

PRESIDENT'S HOMES COMMISSION

MESSAGE FROM THE PRESIDENT OF THE UNITED STATES, TRANSMITTING REPORTS BY THE PRESIDENT'S HOMES COMMISSION ON IMPROVEMENT OF EXISTING HOUSES, AND ELIMINATION OF INSANITARY AND ALLEY HOUSES, ON SOCIAL BETTERMENT, AND ON BUILDING REGULATIONS, TOGETHER WITH RESOLUTIONS AND RECOMMENDATIONS ADOPTED BY THE COMMISSION

JANUARY 8, 1909.—Read; referred to the Committee on the District of Columbia and ordered to be printed with illustrations

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LETTER OF TRANSMITTAL.

To the Senate and House of Representatives:

I transmit herewith reports by the President's Homes Commission on improvement of existing houses and elimination of insanitary and alley houses, on social betterment, and on building regulations, together with resolutions and recommendations adopted by the commission, and ask that they receive the careful consideration of the Congress.

Theodore Roosevelt.

The White House,
January 8, 1909.

THE PRESIDENT'S HOMES COMMISSION.

REPORT OF THE COMMITTEE ON IMPROVEMENT OF EXISTING HOUSES AND ELIMINATION OF INSANITARY AND ALLEY HOUSES.

BY

WILLIAM H. BALDWIN,
Chairman of the Committee.

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PROF. GEO. W. COOK.
EMMETT L. ADAMS.

S. Doc. 644, 60-2——2

REPORT OF THE COMMITTEE ON IMPROVEMENT OF EXISTING HOUSES AND ELIMINATION OF INSANITARY AND ALLEY HOUSES.

The report of the committee on the improvement of existing houses and the elimination of insanitary and alley houses naturally relates to the improvement of houses which are in any way unsafe or detrimental to the health or morals of their occupants, or in case the owners do not think it worth while, or are unwilling to put them into proper condition, to their demolition, in order that the health of the people may not be injured by reason of them. Closely connected with the latter part of the subject is the question of alley houses, which may be structurally fit for habitation but which are so located as to make it practically impossible to supply them with proper sanitary conveniences, or to make the moral and social surroundings what they ought to be.

IMPROVEMENT OF EXISTING HOUSES.

At the time the committee made its preliminary report it was stated that the work of improving existing houses was being wisely and effectively carried on by the board for the condemnation of insanitary buildings, under the law of May 1, 1906. The evils due to the condition into which a large number of the temporary and cheap structures, rendered necessary by circumstances succeeding the war, had fallen was long ago recognized, and in 1872 the board of health, which had been created by an act of Congress in the previous year, formulated a specific ordinance covering the condemnation of insanitary dwellings, under which in 1874, 389 were condemned, followed by 198 in 1875 and 371 in 1876; but the work was stopped not long afterwards by the reorganization of the health department, in which the power to condemn buildings unfit for habitation was not provided for.*

The necessity for further action continued, and as early as 1897 definite steps were taken toward the passage of a bill providing for the condemnation of buildings dangerous to the health of their occupants. These efforts were continued during successive years and in March, 1902, the Associated Charities formed a subcommittee on the improvement of housing conditions, of which the first purpose was stated to be the passage of a law which would enable the District Commissioners, through the health department, to require the adequate repair or removal of dwellings unfit for human habitation; but each year some objection to the proposed bill was made and it was not until May 1, 1906, after nine years of effort, that it was passed in its present form. The necessity of the bill, and the care with which it had been drawn, are shown by the excellence of the results obtained under it.

* Housing Movement in City of Washington, Dr. G. M. Kober, p. 6.

The board to whom the enforcement of the law is by the act itself committed consists of the assistant to the Engineer Commissioner in charge of buildings, the health officer, and the inspector of buildings of the District, but the immediate execution of its requirements is in the hands of an inspector who is thoroughly interested in his work, and who has helped to administer the law in such a way as to secure the necessary results with the least possible hardship to the people who have been compelled by the destruction of the houses in which they were living to seek shelter elsewhere.

Active work under the law was begun on July 1, 1906, and during the two years ending on June 30, 1908, the results had been as follows:

	Examined.	Demolished.	Repaired.	Pending.
Alleys	331	213	97	21
Streets	628	332	127	169
Total	959	545	224	190

Of the 769 buildings acted on 204 had been demolished and 94 repaired in the first year, and 341 were demolished and 130 repaired in the second year.

It will be noticed that in the year 1907 the houses demolished amounted to 68.4 per cent of the cases disposed of and 72.5 per cent in the second year.

It is probable that the proportion of houses demolished will be smaller in future, as the accumulation of dilapidated buildings accounts for a considerable portion of those which have been removed, and the tendency as to those which remain is to make repairs. This has been done in a large number of cases, and in addition many buildings, equal, as far as can be determined by permits issued, to three-quarters of those repaired by order of the board, have been voluntarily repaired and put into proper condition by their owners because they have known that if this was not done the board could, and would, take action in regard to them.

The benefit which has resulted to those of the community most in need of help through the salutary provisions of this law is apparent, and it is a matter of congratulation that in accomplishing these satisfactory results there has been so little friction or complaint of arbitrary or unjust action.

During the last year 6 cases were referred to the corporation counsel for appropriate action in the police court. In one case the owner was fined $10 for failure to demolish, and in another the party was sent to the workhouse for five days for contempt of court, while the remaining cases ended in proper action by the defendants. These instances emphasize the sincerity with which the law has been executed.

The law contains a provision for appeal to the supreme court of the District from the orders of the board, and two such appeals were made during the last year; but in one case it was shown that the time for appeal had expired, and the other case was abandoned, so that the 9 houses involved in both were demolished without further delay or any cost to the board.

For the 94 houses repaired in 1907 no record of the number of occupants was kept. The 130 repaired in 1908 contained 609 people who were benefited by the improvement, an average of 4.7 per house.

The number of people whose lives have been made more comfortable by repairs voluntarily made by the owners of the houses on account of this law can not, of course, be determined, but it is evident that a most gratifying advance in the standard of living has been made and that the reproach of Washington in this respect is being taken away.

This does not mean that these homes are as yet all that could be desired, or that other improvements in these and other houses might not well be made; but to interfere with the independence of citizens, so long as the conditions in which they live are not dangerous to the health or morals of themselves or others, would be doing an indirect injury to our political and social status, and it is far better that the further improvement should be worked out by other influences than the strong arm of the compelling law.

In its last report the board for the condemnation of insanitary buildings says:

> Bad housekeeping and general neglect are responsible for a great many houses being brought to the attention of the board, where, by proper attention to the ordinary household duties, there would be no occasion for complaint. The throwing of ashes and rubbish in the back yard, instead of placing it in cans for authorized collectors, results in the yard being elevated above the door in such a manner that ventilation under the floor is prevented, and it is possible for water to flow in during rain and snow storms, causing the floors to be damp. The habits of different tenants can be better noted in rows of houses where they are occupied under the same general conditions and the character of the houses is practically the same. One will be found in a clean and sanitary condition; others will be found filled with a general accumulation of trash, with no attempt whatever to keep even within a semblance of cleanliness.
>
> In the annual report for 1907 the board called attention to the fact that some provision should be made for a school wherein good housekeeping could be taught, in order to teach the ignorant how to properly take care of themselves and their homes, which is an absolute benefit both to the occupants and the adjoining residents. Conditions have not materially changed since the above suggestion was made and the board, therefore, reiterates the statement.

The inspector said that in one case where the board had required a sewer connection to be made, the trench which was dug showed a geological formation of 4 feet 2 inches of ashes, which had been thrown into the back yard, instead of being put into the hands of the collector of rubbish for removal.

This field, however, appertains rather to the work of the committee on social betterment, which has a firmer foundation on which to build now that the experience of two years has demonstrated that a line has at last been drawn in Washington below which the conditions of any habitation can not fall without its being torn down and removed by constituted authority.

There are still many houses which need repairs, and others, through the neglect of the owners, or perhaps as often through the carelessness of tenants, are getting into a condition which requires attention. Some, where notices are now being served by the inspector, have become unfit since the law was passed, showing the need of constant watchfulness; but the present method promises to secure satisfactory results.

During the last two years a special inspector has been working under the authority given to require connections, where the street is provided with water and sewers, so that there are now comparatively few brick houses, even in alleys, which do not have both; and extensions of water pipes are being steadily made. Residents who fail to comply with the order to connect are taken into the police court, and in case of nonresident owners the District government now makes the needed improvements, under the compulsory drainage act, and charges the cost up against the property.

The building regulations require 8-foot ceilings as a minimum and all new houses or additions must conform to this, though repairs are sometimes permitted when ceilings are 7 feet 6 inches or even not higher than 6 feet 5 inches, but where they are lower than this the owner must either raise the ceiling or demolish the building, so that such cramped sleeping rooms are being done away with.

ELIMINATION OF INSANITARY HOUSES.

As has been intimated, the demolition of houses unfit for human habitation has gone on steadily since July 1, 1906, and in addition to the 545 up to June 30, last, 127 were torn down in the next five months, making 672 demolished in all, of which 245 were in alleys and 427 in streets. The proportion is due partly to the fact that the streets contain more houses, and partly to the fact that, because no more dwellings can be built in alleys, owners repair alley houses which they would destroy if they could substitute new ones for them.

Up to this time the houses acted on have been mostly one or two story buildings, but there are larger ones which need attention, some of them residences converted into flats which accommodate several families. These are being taken up and one of them in Georgetown, a three-story brick, built in 1834 and known as Foxhall Mansions, is now being torn down.

The committee has kept in touch with this work and there has seemed to be no occasion, in view of all the circumstances, to criticise the rate at which it is being carried on. In certain cases the inspector has been obliged to extend the time for the vacation of buildings to be demolished on account of the inability of the tenants to find other dwellings within their means, and while there should be no cessation of the activity of the board the absorption of displaced tenants can not be effected with much greater rapidity.

The persons compelled to vacate the dwellings removed were as follows:

Year ending—	Houses demolished.	Persons displaced.			Average per house.		
		Adults.	Children.	Total.	Adults.	Children.	Total.
June 30, 1907	204	355	203	558	1.7	1.0	2.7
June 30, 1908	341	629	427	1,056	1.9	1.2	3.1
Total	545	984	630	1,614	1.6	1.2	2.9

The small average is due to the fact that many of the houses were vacant, especially in the first year. Counting only those actually

occupied, the average number in the families turned out would probably be five.

Some effort was made to determine definitely what became of these people, but it has been difficult to do this because they quit the premises at any time after notice is served, leaving the house vacant, and no record is made of them.

Of the 1,056 persons displaced in the last year 13 were white, 1 was a Chinaman, and 1,042 were colored. The report for the year says:

> A small portion of these tenants is going to the suburbs and renting or purchasing cheap houses, but the large majority are remaining within the city. A great many are renting the ordinary two-story brick and subletting rooms, or two families rent one house between them, one taking the upstairs and the other the downstairs, converting it practically into a two-family flat, but with none of the accommodations usually found in a building of that character. There is, at the present time, an unquestionable demand for the cheaper class of houses to take the place of those being destroyed.

A further analysis of the facts shows that the houses removed during the year ending June 30, 1908, were assessed for taxation at $40,800 and that they had a rental value of $16,502.40. The average of property in an alley which was investigated as to its assessed value recently showed the land to be 35 per cent of the total, and assuming that it was 40 per cent for that from which the above houses were removed, and that the actual value of the property is 50 per cent more than the assessed valuation, the rentals indicate a gross return of 16 per cent on the investment.

The rental value figures out $4.03 per month per house; but the report of the committee on building of model houses (p. 63) says that not one dwelling has been erected in Washington in the last five years which could be rented as low as $12 per month, and not more than 15 which could be rented as low as from $14 to $16.50 per month. The demolition of the houses in question, therefore, was not offset, so far as these people were concerned, by any new provision of which they could avail themselves, and sharing with others houses too expensive for one such family, with all the disadvantages such an arrangement in houses not built for the purpose involves, afforded about the only means of shelter in the city.

There are a few vacant houses in alleys which rent for from $8 per month up; but even one of these requires a considerable readjustment of the family budget for a tenant who has been paying but $4, and most of the cheapest houses which are vacant, even in alleys, rent for $10 per month or more.

It is evident that such conditions, in connection with the inclination to demand more rent from colored people who desire to occupy decent houses, tend to keep rents high and render living properly on the wages of a day laborer still more difficult.

THE ELIMINATION OF ALLEY HOUSES.

By far the best way to do away with alley houses is to do away with the alleys by converting them into minor streets. So much has been said and written about the disadvantages of the alleys of Washington and the evils of having scattered through the heart of the city a population discredited by the very location of their dwellings, and the difficulty of caring for and supervising them although really

in very close contact with the best residences of the city, that the problem seemed to be one requiring action rather than argument; and as "the rearrangement of the building space within the larger squares of the District of Columbia" was stated by Mr. Reynolds to be one of the purposes of the commission recommended in his report and as the work of improving existing houses and eliminating other insanitary houses has been progressing satisfactorily, as described above, this committee has devoted its chief energy to assisting in the conversion of the undesirable alleys into minor streets.

Under the law of July 22, 1892, as amended on August 24, 1894, the Commissioners at the time of the appointment of the commission had taken action in 12 cases upon the advice of a board consisting of the chief of police, the secretary of the board of charities, and the surveyor of the District, which had been appointed by the Commissioners for the purpose of investigating and advising them in regard to the alleys which most needed to be opened up because the conditions in them were detrimental to the general welfare of the city.

As was stated in the preliminary report the progress of this work had been interrupted by the decision of the Supreme Court of the United States in the Brandenburg case on March 11, 1907, which declared it illegal to assess all the damages on certain property as provided by the existing law unless the property was found to be benefited to that extent.

The Commissioners at the time expressed the intention of having the law amended at the coming session of Congress so as to remove this obstacle and anticipated no difficulty in doing this; and as nothing further could be done in such cases without this further authority, the committee kept in touch with the situation and waited for the necessary action to be taken.

In the first days of January last, before Congress convened after the holiday recess, it was stated in one of the papers that the Engineer Commissioner, who had succeeded to the office after the proceedings had been begun, had recommended that the cases in three of the alleys be dropped because he had inspected them and was of the opinion that the expenditure of the sums necessary to pay the damages which would be incurred in opening them up as proposed would not be justified.

One of these cases is Blagden's alley, square 368, concerning which the chief of police and his associates on the board stated in the recommendation for its conversion into a minor street that—

> Blagden's alley, located between Ninth and Tenth and M and N streets, contains 54 houses inhabited by a negro element who live in poverty and are a source of constant trouble. The dwellings are insanitary and dilapidated and afford shelter to ten or twelve persons each.

Another is square 620, as to which the board reported:

> Logan's place contains 35 insanitary dwellings, which are very much overcrowded, and the inhabitants, being of a vicious character, give the police more or less trouble.

Everyone familiar with these and other such labyrinths realizes the security from police supervision which they afford, to say nothing of other disadvantages which fully justified the recommendation of the board.

There was no suggestion of any other plan, and the only reason given was that it was not worth while to spend the money required to do away with the wretched conditions by which the city has been for so long disgraced, and as this objection, if sustained, would make permanent such conditions in these three alleys, which are among the worst in the city, and put the whole matter upon a different basis, the committee took the subject up with the Commissioners and strongly urged that no effort be spared to pursue the original plan of the Commissioners, and to provide some way by which they could proceed to open up such alleys as they might, after investigation, think it worth while to convert into minor streets. These suggestions were cordially received by the other two Commissioners, and it was understood that the subject would be discussed with the corporation counsel with a view to arriving at the best way of accomplishing this object, and that any assistance which the committee could give would be welcomed.

The committe therefore consulted with the corporation counsel and looked up the law in other places, but as one of the Commissioners was compelled to go to the hospital for a considerable stay, not long after this, further action was delayed. The situation, which was fully reported to the commission at a meeting held January 17, 1908, seemed so serious that the commission adopted a resolution urging that the District Commissioners "take all possible steps toward opening alleys into minor streets in each case recommended by the committee appointed for the purpose, and that such changes in the present law be recommended by the Commissioners as will permit the conversion of these alleys or any others into minor streets, to the end that all such alleys may within a reasonable time be done away with;" and the report of the committee, with this resolution, was submitted to the Commissioners by the chairman of the President's Homes Commission.

The principal difficulty with the present law seemed to be that it required that an amount equal to the damages found should be assessed as benefits and that this should be assessed within a limited area. It was found that the law of 1906 in relation to the opening, extension, widening, or straightening of streets, provided that the jury should assess benefits not only upon adjoining and abutting property, but upon any and all other lots, pieces, or parcels of land which the jury might find to be benefited by the improvement. This apparently indicated a plan by which the amounts required could be raised in a more equitable manner, but as it seemed probable that in many cases the damages awarded would even then exceed the benefits which the jury might find, it seemed desirable to include also a provision by which a certain proportion of the awards could, if necessary, be paid out of some general fund.

One of the Commissioners had suggested, when the Engineer Commissioner recommended that the work be stopped on account of the expense, that legislation might be urged providing that the alleys be opened and a certain proportion of the expense be paid by the United States Government, another portion by the District government, and the remainder be assessed upon the property owners in the neighborhood of the improvement. Inasmuch as the deplorable conditions of the alleys have grown up under the administration of the

District government, it seems proper that a considerable portion of the expense of removing them should be borne in this way by those responsible for them; but, as any payment for District purposes by the Federal Government would be contrary to the definite policy adopted by Congress, it did not seem advisable to the committee to advocate such a provision.

In order, however, to expedite the passage of any bill recommended and to profit by the advice of the District Committee in each House of Congress, as well as to secure their cooperation in any plan which might be proposed, the committee consulted with the chairman of each of the District Committees as to what fair provision would be most effective. The chairman of the Senate Subcommittee on Streets and Avenues declared that conditions which he had himself recently witnessed in the alleys of the city ought nowhere to exist, and that he would be glad to do all he consistently could to remove them. After full discussion he stated that if the amount to be paid from the general funds of the District could be limited to 25 per cent of the total damages awarded in any case, and the remainder be assessed upon any property benefited, he would earnestly recommend such a provision, with the full expectation that such a bill might be promptly passed by Congress.

The chairman of the House committee, when consulted, concurred in this view and promised similar cooperation. A meeting of the commission, at which this plan was unanimously indorsed, was promptly held and the recommendation for such a bill was immediately put before the Commissioners by the committee, with every reason to expect that it would be promptly acted upon, so that the measure might be passed before Congress adjourned.

Notwithstanding the fact that two of the Commissioners were heartily in favor of the general plan, the matter was delayed, and upon inquiry it was found that the Engineer Commissioner strongly objected to the plan proposed, on the ground that no jury would be apt to assess in any case more than 75 per cent of the damages found, and that in this way the District would be made to pay for 25 per cent of the cost of opening many alleys and minor streets in property where the expense should all be borne by the property owners who requested it. As further investigation developed the fact that there are numerous cases of this kind to which it was not intended to have this provision apply, the matter was again taken up with the corporation counsel and a modification adopted limiting the operation of this provision in each case to the conversion of alleys into minor streets running through the block.

When, however, this reached the Engineer Commissioner he still objected to the bill on the ground that it was likely to do injustice to the District, declaring that juries would not assess greater damages in any case than they were compelled to and that the only way to meet the situation was to introduce a special bill in Congress for each alley.

As the special bills introduced for this purpose in reference to squares 1020, 878, and 801 had received no attention and the amount of effort needed to secure the passage of any bill is very great, and as it would be necessary in the case of each special bill to take up the attention of Congress with the objections of interested parties which could better be considered and attended to by the Commissioners, who

have more immediate knowledge of the circumstances, the committee still urged that the plan proposed by the bill be followed and that the solution of the alley problem be not simply left to a system under which it has been growing steadily worse.

It was therefore suggested that the whole subject be taken up at a conference of the Commissioners, the corporation counsel, and the committee; but the conferences and references had taken so much time that, on account of the legislative situation developed toward the close of the last session of Congress, it was by this time found that the enactment of the measure at that session was wholly impossible, and the proposed conference was not held until May 29.

At this conference the three Commissioners, with two assistants of the corporation counsel and the surveyor and two members of the committee, were present. The whole subject was thoroughly discussed, and the objection of the Engineer Commissioner that the proposed amendment might result in the payment by the District of some of the damages in certain cases where they ought to be paid by the property owners was considered, as well as the objection that even under this provision some alleys could not be opened, because the difference would still be more than the 25 per cent provided for. One of the other Commissioners, however, met the situation squarely by saying that, although the law might in this way work some disadvantage to the District in certain cases, he thought this would be more than offset by the advantage of having a law under which the Commissioners could proceed according to their judgment in so many cases in which the alleys ought to be replaced by minor streets, and that he was ready to recommend the proposed bill. As there seemed to be no way of overcoming the objections of the Engineer Commissioner, and no better way of meeting the difficulty, the other Commissioner declared that the matter having now received full consideration, he also would approve the bill. It was therefore understood that the bill, which is as follows, would be promptly introduced at the present session:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress Assembled, That section 1008 j of the act of Congress entitled "An act to establish a code of law for the District of Columbia," approved March 3, 1901, as amended by the act of Congress approved February 23, 1905, be, and the same is hereby, amended to read as follows:

SECTION 1008 j. That said jury shall assess as benefits accruing by reason of said opening, extension, widening, or straightening an amount equal to the amount of damages as ascertained by them as hereinbefore provided including five dollars per day for the marshal and five dollars per day for each juror for the services of each when actually employed, and all other expenses of such proceedings upon each lot or part of lot or parcel of land in the square or block in which said alley or minor street is to be opened, extended, widened, or straightened, and upon each lot, part of lot, or parcel of ground in the squares or blocks confronting the square in which such alley or minor street is to be opened, extended, widened, or straightened, which will be benefited by such opening, extension, widening, or straightening, in the proportion that said jury may find said lots, parts of lots, or parcels of land will be benefited: *Provided, however*, That whenever the Commissioners of the District of Columbia, under the foregoing provisions, shall institute proceedings for the widening or extension of any alley so as to convert said alley into a minor street through the square in which said alley is located, such an amount of the total amount of damage as ascertained by the jury, as hereinbefore provided, including five dollars per day for the marshal and five dollars per day for each juror for the services of each when actually employed, and all other expenses of such proceedings, shall be assessed by the said jury as benefits, and to the extent of such benefits

upon each lot, or part of lot, or parcel of land in the square or block in which such alley is to be converted into a minor street, and upon any and all other lots, pieces, or parcels of land which the jury may find will be benefited by the said widening or conversion of such alley into such minor street, as the said jury may find said lots or parts of lots, pieces or parcels of land will be benefited; and in determining the amount to be assessed against such lots, or parts of lots, pieces or parcels of land, the jury shall take into consideration the respective situations and topographical conditions of such lots, or parts of lots, pieces or parcels of land, and the benefits and advantages they may severally receive from the said widening or conversion of such alley into such minor street. If the total amount of the damages awarded by said jury, and the costs and expenses of the proceeding be in excess of the total amount of the assessments for benefits, such excess shall be borne and paid by the District of Columbia: *Provided*, That such excess so to be paid by the District of Columbia shall in no case exceed twenty-five per centum of the whole amount of the damages as ascertained by the said jury.

The commissioners are not obliged to accept an award unless they think it for the benefit of the public to do so, but can annul the whole proceeding, so that they can still fully protect the interests of the community.

In accordance with this understanding the bill was brought to the attention of the commissioners just before the opening of the present session of Congress. It has received their approval and is to be introduced by them with a request for its speedy enactment.

While the committee is greatly disappointed at its failure to secure the expected legislation at the last session of Congress, it is to be hoped that the proposed measure will be promptly passed at this session, and that under it the commissioners will be able to reach many cases of alleys which ought to be opened.

The facts brought out in this discussion, when considered in the light of the experience in other places, suggest the advisability of going still further in the endeavor to reach the difficulty. The District officials who have had the conduct of these appropriation cases are all of the opinion that juries are, perhaps unconsciously, inclined to be liberal in fixing the amount of damages that are to be awarded to property owners and that in the same manner they are reluctant to assess upon adjoining property as much benefit as it is likely to receive from the change in conditions. The result of this is that so far as the District is called upon to make up the differences it suffers in both ways. Those whose property is partly taken receive a high price for what they dispose of, while the remaining portion is made more valuable by the street which is opened. Square 513 contains a minor street called Ridge street, which runs through the block in place of the usual alley. An investigation made two years since by the committee on improvement of housing conditions in this and the adjoining square, No. 512, which contains Kings court, showed that the land in the interior of square 513, where the minor street had been opened some years before, was assessed for taxation at an average of $0.41 per square foot, while the land in the interior of square 512 in which the alley conditions still remained, although having more frontage in proportion to its depth, was assessed at $0.24 per square foot, indicating, at the ordinary rate of valuation, actual values in each case of $0.36 and $0.62 per square foot, more than 70 per cent greater in the square with the minor street.

The lots fronting on Ridge street contain 127,332 square feet, on which a difference of 26 cents per square foot would amount to

$33,106, which was more than the estimated cost of opening the alley. One of the last acts of the committee on the improvement of housing conditions was to request the action which was afterwards taken by the Commissioners in regard to this square, which is the only one in which the alley has been actually converted into a minor street, though that in square 650, which was also confirmed by the court and in which a difference about titles has been cleared away by an act of Congress just passed, will now be opened also. The total cost of opening the alley in square 512 was $28,851.20, less than the difference in value between it and the adjoining square.

It is of course too soon to tell whether an increase to the level of property values in square 513 will take place in square 512 on account of the improvement, but the suggestion has been made by those who are familiar with the facts that if, instead of paying at such a high rate for only part of the property and getting none of the resulting benefits, the District would take the whole of the property affected and itself receive the benefit of the enhanced values, the cost to the community of removing the alley evils would be very much lessened.

This brings in a principle which is new here but which is not unknown in other countries, and to which it has been necessary to resort in England in order to do away with conditions which have grown up there much as those in the alleys have grown up here.

The housing of the working classes act, which was passed in 1890 and which superseded and improved previous attempts in this connection,[a] provided not only that individual houses might be condemned as insanitary, as is done under the law of 1906 here, but also that an area containing streets and many houses might be declared "unhealthy," and taken over by the local authority; and that the buildings might be removed, the streets rearranged and other dwellings erected, either by agencies to which money would be furnished by the local authority, or if necessary by the local authorities themselves. In fact, the law made it obligatory upon the local authorities in London to provide housing accommodations for at least 50 per cent of the people displaced, which has since been raised by an amendment making the required provision equal to all, and in other districts to such an amount as might be determined by the local authority to be adequate under all the circumstances.

Under this housing of the working classes act numerous wretched districts have been cleared up and comfortable and healthy dwellings provided;[b] and although the cost to the community has been considerable in certain cases, where the evils to be remedied were of long standing and very great, the law has done great good, and the attention of those interested in the subject is being given to improving its operation rather than to changing it in any radical way. It aims, so far as possible, to protect the interests of the community in acquiring any property which has become detrimental to the well being of the district, while at the same time dealing justly with the owners. The method of procedure requires the local authority to take the initiative, and where a loan is necessary, as it often is where

[a] The Housing Handbook, W. Thompson, App., p. 1.
[b] Op. cit., p. 45.

an area is acquired, the plans for this and for the improvement of the area must be approved by the central authority in London.

Instead of being fixed, as here, by a jury which is subject to the influence of acquaintance with those whose property is under consideration, the values under the English law are fixed by an arbitrator who is appointed by the central authority, the local government board, and who is sworn to act "faithfully and honestly, and to the best of his skill and ability hear and determine the matters referred to him under the provisions of the housing of the working classes act;"* and it is upon his recommendation, after careful and intelligent consideration of all the conditions and surroundings, that the award is made.

It will be noticed that the situation in the District of Columbia is similar to that in England, in that the District government resembles the local authority, which can take the initiative in regard to any alleys which require attention, but which can not act without the consent of an authority not local, which in the case of the District is Congress.

The ordinary danger in giving to public officials, who are in entire control, considerable discretion in the disbursement of public funds is, therefore, removed, and it ought to be possible for Congress to give such a plan a fair trial without incurring any very great risk.

The committee is convinced that the objections made to its proposed amendment to the alley law by some of the District officials grew out of their sincere regard for the public welfare and their reluctance to consent to anything which would open the way for property owners to get from the public more than they ought to receive for property taken. The committee was, and is, equally averse to doing anything which would open the door to an improper expenditure of public money, but the very attitude of these officials, and the clean record which the District government has had in the past so far as anything like what is called "graft" is concerned, give ground for believing it is safe to allow some discretion in this matter; and if these officials are as resolute in aggressive work as they have been in opposing the recommendations of the committee, they ought to accomplish much.

If in this connection the responsibility of placing the valuation upon property taken could be committed to an arbitrator duly appointed and responsible for his record, as a judge is, instead of to a jury of citizens of the neighborhood, who act only for one particular case and have no permanent responsibility, the results might be more equitable.

The uncertainty of awards by a jury and the tendency to favor property owners as against the District under the present system are clearly illustrated by two cases which were tried under the present law prior to the Brandenburg decision, when juries were expected to find benefits equal to the damages assessed. Upon the second trial of these cases, after the first verdict had been set aside and the jury was no longer under any conservative influence in fixing the damages and benefits, the damages found were much greater and the benefits much smaller. If fixed after a careful study of values by some one free from any connection with the property owners such irregularities would be less likely to occur.

* Op. cit., App., p. 41.

With some discretion allowed which would permit the District officials to take all instead of part of any property for which damage is claimed in opening an alley, or to appropriate other connecting land, where it seemed to the interest of the community to do so, land might be made available for the erection of the low-rental houses so much demanded by the needs of men earning only laborer's wages;* and if this could be coupled with a reasonable loan of public funds under proper safeguards at a low rate of interest, in cases considered proper by the District officials, the work of the Washington Sanitary Housing Company, which halts at a slightly higher rate, would be supplemented, the way for reconstructive action would be opened, and the alley land by which the city is now burdened might become a source of satisfaction from an economic as well as from a social standpoint.

Should there be any indications that any such power granted by Congress was being indiscreetly or improperly used by the officials of the District it could be promptly discontinued; but if the results proved the wisdom of the method it could be continued and improved on until the alley problem is solved.

The committee hesitates to recommend any novel or radical measures, but calls attention to the possibilities which the difference between the government of Washington and that of all other cities in the country suggests.

Although the erection of any more buildings in alleys was practically stopped by the act of July 22, 1892, additions to the number have occasionally been made by converting buildings erected on alleys for other purposes into dwellings. Such an instance, in which a stable had been converted into an alley dwelling and the second floor occupied by two colored families, was referred to the corporation counsel by the inspector of buildings in March last and an opinion rendered that such action could not be prevented because the act of July 22, 1892, did not apply.

In order to meet this situation a bill forbidding any such conversion of other buildings into dwellings fronting on alleys was prepared by the commission appointed to revise the building laws, and should receive prompt attention in order that further evasions of the alley law may be prevented.

In a plan proposed for improving housing conditions in German cities provision is made for homes of working people in narrow streets running through and connected with those portions in which the residences of people of larger means are found, instead of having each kind in a district by itself. Such a plan would have a peculiar advantage in this democratic country, where the difference should be not in character, but simply in the standard of living, and would be for the convenience both of employers and employed. Such

* In many German cities considerable land acquired for the purpose of providing homes for the working classes is held by the municipality. (The Example of Germany, by T. C. Horsfall, p. 25.)

The example has been followed by Holland, in which Amsterdam has acquired compulsorily 2,500 acres—nearly 4 square miles—and adopted an extension plan. Two other cities have each about half as much, and three others have smaller quantities. (Housing Up to Date, W. Thompson, p. 194.)

Berlin had 85 square yards per capita, which would, on a basis of 325,000 population, be equal to more than 5,700 acres for Washington.

a system we practically have now in the alley dwellings, in which the contact with the best residences of the city is so close; so that by the conversion of these alleys into minor streets, permitting decent living and encouraging self-respect in those residing upon them, we could establish a healthy social circulation in the body politic by which we would obtain all the advantages of the German plan while doing away with the conditions which are now a constant menace to the welfare of the community.

While the committee is fully alive to the perplexities connected with the alley problem, it is also impressed with the necessity of action in regard to it. It does not wish to enlarge on the well-known reasons for opening the alleys, but it can not admit that it is not "worth while," even if the process is expensive, to put the city on a proper basis; and thorough constructive work is, and will be, impossible as long as so many blocks, fair on the outside, contain these centers of vice and misery. To refuse to remove them because it costs something is like refusing to escape blindness by the removal of a cataract because of the fees of the oculist.

The passage of the proposed amendment will enable the Commissioners to take up the interrupted cases and to start others, under which a large number of the alleys of the city can be replaced by desirable streets.

So far the way is plain, and this experience will indicate the best method of reaching the others. The further suggestions are made in the hope that the District government, which has certain disadvantages under which these evils have grown up, may be found to possess also certain advantages over other forms by which, if they are recognized, the evils may be done away with with less expense than they could be under some other system, but the committee is firmly of the opinion that in any event the alleys must go.

Respectfully submitted.

THE COMMITTEE ON IMPROVEMENT OF EXISTING HOUSES AND ELIMINATION OF INSANITARY AND ALLEY HOUSES.
By WM. H. BALDWIN, *Chairman.*

WASHINGTON, *December 17, 1908.*

Upon presentation of the above report, the following resolutions were adopted by the President's Homes Commission:

Resolved, That Congress be urged to promptly pass the amendment to the code proposed by the Commissioners, allowing a difference between the damages found and benefits assessed in any case of the conversion of an alley into a minor street not greater than 25 per cent of the total damages, to be paid out of the general fund of the District.

Resolved, That the Commissioners be urged to give prompt and constant attention to the alley problem under their present plan, in order that, either by the general law or by special act, all such alleys may, within a reasonable time, be done away with.

Resolved, That a bill should be promptly passed by Congress forbidding the conversion into dwellings of any buildings designed for other purposes fronting on alleys.

REPORT OF THE COMMITTEE ON BUILDING REGULATIONS.

To the President's Homes Commission:

Your committee on building regulations begs leave to submit the following report:

Immediately after the appointment of the committee it met for the purpose of considering the extent and scope of its work. The first conclusion reached by the committee was that it was not called upon to attempt any revision of the building regulations as they affected the construction of houses for the poorer or least resourceful classes of the community, particularly in view of the fact that, before the appointment of the committee, the District Commissioners had appointed a commission composed in part of officials of the District government and citizens, for the purpose of making a complete revision of existing building regulations. The commission has been in existence for nearly two years, but has not yet completed its work. Your committee placed itself in touch with the commission referred to, with the result that the commission courteously resolved to submit to your committee such regulations as it might recommend for adoption to the Commissioners of the District, with a view of securing our consideration and criticism of such regulations. Two of such regulations have been referred by the commission to your committee, the first being the regulation touching the important questions of ventilation and light. This regulation received the careful consideration of your committee, with the result that several important changes were recommended, most of which were adopted by the commission and the District Commissioners. This matter has been the subject of a prior report by your committee to the Homes Commission.

The second regulation submitted covered the subject of party walls. This regulation proposed a uniform width for such walls of 18 inches for all dwellings. It was, and is the opinion of your committee, that a distinction should be made between the width of walls for a house not to exceed two stories in height (and in that case it was and is believed by the committee that a 9-inch wall would be sufficiently wide to absolutely insure structural safety and protection from fire) and those for dwellings designed to be more than two stories in height. In the latter cases the width prescribed by the regulation referred to is probably right. On this point, as your committee understands it, the building commission and the District Commissioners do not agree with your committee.

Your committee further reports that in August last it recommended to the Commissioners of the District the incorporation in the revised Code of Building Regulations of definitions of various buildings. Whether this recommendation received the approval of the commission and the commissioners or not, your committee is not informed.

Your committee has been embarrassed in the prosecution of its work by what seems to it to be the delay on the part of the committee on revision of the building regulations in completing its work. Your committee made the recommendations that it did, touching the two regulations referred to it as above set forth, with the reservation that its recommendations were subject to its consideration of the full code whenever it should be completed. Respectful suggestions have been made by your committee to the District Commissioners of the im-

portance of an early completion of the work of revision referred to. It has, however, no information as to when the revision is likely to be completed, and it can, therefore, make no definite, full, or satisfactory report upon the subject.

Your committee, thinking that perhaps information of advantage on the general subject could be obtained from cities in England and on the continent of Europe, applied to the Secretary of State to secure from our consuls-general and consuls data upon the subject. The Secretary very promptly complied with the request of your committee and directed that the consular officers mentioned collect and forward as promptly as possible the material called for, and this has been coming to your committee. A considerable part of this material is not available to your committee, because it is not translated into English, but information from various English cities has been forwarded and is now in the archives of the homes commission. The Right Honorable John Burns, chairman of the local government board and a member of the present British cabinet, took more than a perfunctory interest in the request made of him by our consul-general to London, and, through the latter, forwarded material of interest and value. But until your committee knows what will be embraced in the proposed revision of the building regulations for this District, the practical use to which the committee can put the data thus gathered is problematical.

In conclusion, your committee expresses the hope that an opportunity will be afforded it of making another report when it has received a copy of the revised code of building regulations and has had an opportunity to carefully consider the same.

All of which is respectfully submitted.

F. L. SIDDONS, *Chairman.*
GEO. M. STERNBERG,
WM. H. BALDWIN.

RESOLUTIONS AND RECOMMENDATIONS OF THE COMMISSION.

At a special meeting of the President's Homes Commission, held on December 17, 1908, the following resolutions and recommendations were unanimously adopted:

Resolved, That in the opinion of this commission the building regulations in the city of Washington should permit the building of two-story brick buildings having a frontage of not less than 14 feet and walls 9 inches thick: *Provided*, That such buildings have good foundations, satisfactory ventilation under the first floor, and bathrooms with water supply and sewer connections.

Resolved, That in the opinion of this commission no apartment house more than three stories in height should be built in the city of Washington, unless it is of fireproof construction and is provided with elevators.

Resolved, That in the opinion of this commission the Congress of the United States should authorize the loan of money, at a low rate of interest, to building associations organized for the purpose of building sanitary houses for the working classes in the National Capital; satisfactory real-estate security to be given for the repayment of such loans and suitable provisions enacted to insure moderate dividends upon the capital invested in such enterprises, and low rentals for the houses constructed, in order that they may be within the means of unskilled wage-earners.

Resolved, That Congress be urged to promptly pass the amendment to the code proposed by the Commissioners, allowing a difference between the damages found and benefits assessed in any case of the conversion of an alley into a minor street, not greater than 25 per cent of the total damages, to be paid out of the general fund of the District.

Resolved, That the Commissioners be urged to give prompt and constant attention to the alley problem under their present plan, in order that either by the general law or by special act all such alleys may, within a reasonable time, be done away with.

Resolved, That a bill should be promptly passed by Congress forbidding the conversion into dwellings of any buildings designed for other purposes fronting on alleys.

The following recommendations submitted by the committee on social betterment were also approved:

1. The enactment of model factory and labor laws for the employees of the Government and for the District of Columbia. Such laws, apart from regulating the hours of labor, should also make adequate provisions for the sanitation of workshops, for employer's liability in case of accidents, and for a comprehensive system of industrial insurance for all government employees and employees in the District of Columbia. (See pp. 72–93 of report submitted February 4, 1908.)

2. The appointment by the President of a special board, composed of architects and sanitarians now in the employ of the Government, for the purpose of evolving model plans and building regulations for government workshops and office buildings, so that no such buildings will hereafter be erected without due regard to air space, ventilation, light, heating, temperature, humidity, sanitary conveniences, and

other provisions, including sanitary supervision referred to in a previous report, pages 71 to 83.

3. The establishment in the National Museum, and in connection with museums in industrial centers generally, of a special section devoted to exhibits illustrative of the hygiene of occupations, habitations, food, safety appliances, and other collections for the promotion of industrial and social betterment of wage-earners, along the lines indicated on pages 85 and 86 of the report, February 4, 1908. It may be found necessary to house such exhibits ultimately in a special building.

4. While it is gratifying to record a very deep interest in the public schools of Washington in all matters related to social and industrial life, the committee is of the opinion that even greater emphasis should be given in the curriculum to manual training and domestic science, because the practical knowledge thus acquired not only inspires respect for manual labor and domestic service, but constitutes in fact the foundation stone for intelligent work and home making.

5. The importance of a thorough practical training in domestic science is nowhere more evident than in a study of our family groups whose income is less than $700 a year. While conditions on the whole indicate a fierce struggle for existence, some splendid examples of neat and healthful homes of thrift and happiness could be cited for the emulation of less competent neighbors.

6. Since the scale of wages in certain occupations has not kept pace with the cost of living, the committee recommends adequate compensation of all employees, whether in the government service or in other fields of activity. This applies with special emphasis to married men earning less than $2 a day. No effort should be spared to improve the social condition of poorly paid wage-earners, and justice likewise demands an increase in the scale of salaried employees in order to compensate for the increased cost of living, especially when no such increase has been made within the past ten years. It is believed that the principle of permanency of employment, which is so well established as to large numbers of government employees, should be extended to others to whom it does not now apply, so far as the interests of the Government permit.

7. The committee is of the opinion that the standards of living could be materially improved by diminishing the expenditures for tobacco and intoxicants. Taken as a whole, the families investigated could add on an average at least one room to their overcrowded homes if the money expended for these items were devoted to the payment of rent.

In order to restrict the consumption of these harmful agents much may be done by educational methods, the establishment of social settlements in connection with the public schools and churches, and the creation of genteel and inexpensive amusements calculated to counteract the influence of saloons and evil resorts. The sale of tobacco and intoxicants to persons under the age of 21 should be prohibited by law. We also recommend greater restriction in the sale of proprietary medicines containing alcohol in sufficient quantity to be intoxicants, and greater restriction in the licensing of saloons in residential and manufacturing sections.

We also recommend the enactment of a bill introduced by Senator Gallinger, making drunkenness a misdemeanor, and placing habitual drunkards and drug habitués under legal restraint in the hospital for inebriates in order to bring about their permanent reformation. The committee believe that the provisions of the bill will be materially strengthened by making the sale of intoxicants to habitual drunkards a criminal offense and to hold the seller responsible for all damages, when properly warned not to dispense intoxicants to minors and habitual drunkards.

8. The committee believes that public playgrounds and athletic fields will promote temperance and chastity, and since we are familiar with the physical ravages of vice and disease and the public expenditures incident thereto, we recommend most liberal appropriations for all such moral and social prophylactic measures.

9. Your committee believes that quackery and the great nostrum evil are frequent causes of physical and financial impoverishment. In view of the importance of the subject, we recommend the appointment of a special board composed of a representative of the Attorney-General in the Post-Office Department, of the Public-Health Service, and the chief of the Bureau of Chemistry, United States Department of Agriculture, for the purpose of investigation and the formulation of such additional legislation as may be deemed necessary in the interest of public health and morals.

In the meantime it is earnestly recommended that the Postmaster-General be requested to publish with the monthly Supplements to the Official Postal Guide, a bulletin setting forth the essential facts in connection with the fraud orders issued during the preceding month, such bulletins to be posted in post-offices and to be distributed in sufficient numbers along rural delivery routes.

We also recommend that all information concerning harmful ingredients in foods, medicines, soft and alcoholic drinks which may come to light during the execution of the pure food and drug law be published by the Department of Agriculture in the same manner as "Farmers' Bulletins" are now being published. The public is entitled to be warned, and for this purpose the indisputable facts should emanate from some official source.

10. The committee strongly recommends the enactment of a law for the suppression of usury as contemplated by Senate bill 2206 and H. R. 11772. Your committee is convinced that there is a necessity in every community for pawn shops and money-lending concerns, to aid persons who are unable in an emergency to secure loans from banks, trust companies, or real estate brokers. It has been shown that the system now in vogue is attended with gross abuses, absolute extortion, and financial distress which calls for remedial action. Since it has also been demonstrated by the experience of the New York Provident Loan Society (a strictly business philanthropy) that such operations can not be carried on at a lower rate of interest than 1 per cent per month, we recommend that the maximum rate of interest be placed not higher than 2 per cent per month. This will legalize the business, enable respectable people to enter the field, and, by wholesome competition, bring about the desired result. The license tax in the proposed bill should be reduced from $1,000 to $100

per annum; a suitable reduction should likewise be made on the recorder's fees on chattel mortgages involving amounts less than $100, as all these expenses are placed by indirection on the borrower. The execution of such a law involves careful official supervision, such as is contemplated in the recommendations of Mr. James Bronson Reynolds in the creation of the bureau of labor.

11. The creation of a bureau of labor would likewise render valuable services both to employers and employees in the supervision of employment agencies, the correction of abuses connected therewith, and also in the enforcement of labor laws, sanitation of factories, workshops, etc.

The fact that in our sociological study of 1,217 families comprising a population of 4,889, 2,202, or 45 per cent, carried life insurance, and 855, of 17½ per cent, carried insurance against sickness, constitutes a strong argument in favor of a comprehensive system of workingmen's insurance, and adequate supervision, such as recommended by Mr. Reynolds in his report to the President, April 29, 1907.

12. Our sociological investigation shows that out of 5,157 persons enumerated 613, or 12 per cent, had been sick during the past year with an average duration of 29.5 days, involving a loss of 18.083 days of work. This, together with information collected by the Board of Charities, emphasizes the need of hospital facilities for convalescents where the earning capacity of dependent patients after an acute illness may be expedited. As it is now, the recovery of such persons is greatly retarded by a return to insanitary homes, insufficient and improper food, etc.

13. The cases of permanent disability found in the 1,217 families are comparatively few, namely 42. Of these the age is given in 39; 3 of these were under the age of 19 years; 14 between 20 and 49 years; and 22 were over 50 years. This does not include the cases cared for in public institutions, which are taxed to their utmost capacity.

In order to reduce the number of defectives, preventive measures must be invoked early in life and an able corps of teachers, medical inspectors, and instructive visiting nurses can render most efficient service. A recent inspection of 43,005 pupils in the public schools shows that 15,304 children, or 35.2 per cent of the total examined, are in need of medical or dental service.

Your committee recommends that the study of hygiene be made an important part of the school curriculum, also the appointment of instructive visiting nurses in the schools, and that medical inspectors, nurses, and teachers be authorized to suggest to pupils and parents the desirability of securing prompt professional advice in all cases where it is indicated, and especially in such instances as are likely to result in permanent disability.

14. In the interest of general sanitation your committee recommends (1) the further purification of the water supply advocated by the officers in charge of the filtration plant; (2) the reclamation of the Anacostia Flats for the reduction of malarial fevers; (3) the enactment of a more stringent law regulating the production and sale of milk and dairy products, for the reduction of milk-borne diseases; (4) the abandonment of box privies, removal of slums, establishment of public baths for all seasons of the year, more liberal appropria-

tions for the health department, and a larger corps of sanitary inspectors so that the gospel of cleanliness and health may be enforced within and without the homes; (5) greater cooperation on the part of the police courts with the efforts of the health department in the enforcement of sanitary laws and ordinances.

Some of these recommendations have been urged by the Commissioners for years; they are of vital importance to the health, not only of every permanent resident, but of the chief magistrate, his cabinet, the foreign ministers, thousands of public officials, the members of the Senate and House of Representatives, and all citizens having business with Congress, besides the numerous visitors who annually pay homage to the city of Washington.

INDUSTRIAL HYGIENE AND SOCIAL BETTERMENT.

A REPORT OF COMMITTEE ON SOCIAL BETTERMENT OF THE PRESIDENT'S HOMES COMMISSION.

BY

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REPORT OF THE COMMITTEE ON SOCIAL BETTERMENT.

WASHINGTON, D. C., *December 1, 1908.*

The committee on social betterment has realized throughout its work that the question of health is intimately connected with the physical, social, and moral welfare of all persons whose only income is the product of their daily labor. Health is the chief asset of the workingman, and no greater calamity can befall him than when his earning capacity is impaired or arrested by reason of sickness or disability. It means in many instances the utter financial ruin of the family and is doubtless one of the most potent causes of poverty and distress.

Many of the diseases are incident to occupations and environments, and industrial efficiency and earning power can be promoted by appropriate safeguard and adequate protection of the men, women, and children engaged in gainful occupations.

It has been the aim of the committee to emphasize therefore the causes and prevention of industrial diseases and also of some of the principal preventable diseases, like tuberculosis, pneumonia, typhoid fever, sexual diseases, etc.

The committee has also studied the standards of living in 1,217 families; of these 476, or 39 per cent, had a family income of $500 or less per annum; 159, or 13 per cent, had an income of from $500 to $600; 153, or 12½ per cent, from $600 to $700; 153, or 12½ per cent, from $700 to $800; 89, or 7 per cent, from $800 to $900; 93, or 8 per cent, from $900 to $1,000; and 94, or 8 per cent, had an annual income of over $1,000.

The results of these fairly accurate returns concerning income and expenditures and general standards of living are set forth in a special report by Mr. G. A. Weber, of the Bureau of Labor, who was appointed statistician to supervise the work. The data with reference to the expenditures for rent, food, liquor, tobacco, sickness and death (including expenditures for patent medicines), number of working hours, wage-earners' lunches, insurance, installment purchases, usury, etc., are of interest and importance.

In addition to presenting such topics as "How to keep well and capacitated for work," the committee in its efforts to improve the homes and better the lives of the industrial classes, believes that special attention should be given to the question "How to live well and cheaply," and for this purpose invoked the aid of Dr. C. F. Langworthy, expert in nutrition of the United States Department of Agriculture, who cheerfully consented to prepare a special article on "Good food at reasonable cost." Miss E. W. Cross, of the department of domestic science of the McKinley Manual Training School, has

worked out dietaries and menus for families with an income of $1.50 a day.

Believing that a survey of the causes which lead up to low standards of living would not be complete without reference to the alcohol question, the tobacco and drug habits, the great nostrum evil, and the usury evil, special studies have been made of these subjects and the results, with suitable recommendations, will be found in our report. Miss Mabel T. Boardman has prepared an excellent article on recreation and inexpensive amusements, Mr. James Bronson Reynolds has prepared the article on the business relations of wage-earners, and Mr. William F. Downey has written the article, How to benefit the poor in the slums. The thanks of the committee are also due to Dr. Paul B. Johnson, Mr. R. M. Webster, Prof. H. W. Wiley, and Dr. Lyman F. Kebler of the Bureau of Chemistry for valuable material and to General Sternberg for a careful revision of the manuscript.

GEORGE M. KOBER, *Chairman.*

PART 1.—INDUSTRIAL HYGIENE.

CHAPTER I.

INTRODUCTION.

In the search for the causes and prevention of diseases the interests of the wage-earners have not been neglected; indeed, it may be truly said that a special department has been created, known as industrial hygiene or social medicine, with a most complete and satisfactory literature of its own. German authors, in 1897, issued a volume of over 1,200 pages, and English authors, under the editorship of Dr. Thomas Oliver, devoted 891 pages to "Dangerous Trades—the Historical, Social, and Legal Aspects of Industrial Occupations as Affecting Health." The writer, during his visit to Berlin in September, 1907, met Dr. E. J. Neisser, who had just completed an "International Review of Industrial Hygiene," covering a volume of 352 printed pages. Doctor Neisser deplored his inability to present a general review of the work accomplished in the United States for the promotion of the welfare of the wage-earners, since, with the exception of the reports of the inspector of New Jersey, no recent data concerning factory sanitation were available for publication. Realizing the importance of the subject, not only to wage-earners, but to all interested in the conditions under which our fellow men and women live and work, an effort has been made in the succeeding pages to supply this information.

It is, indeed, a feeble attempt towards amelioration of existing conditions, when compared with the monumental volumes of German and English authors. The writer acknowledges his indebtedness to Doctor Neisser for the inspiration given him by his own good and unselfish work, and also to all authors consulted by him, and to whom credit is given in the text.

It is hoped that this study of the causes of sickness and the means of promoting industrial efficiency and earning power, will fill one of the obligations which the committee on social betterment assumed to discharge.

A pioneer study was made by Professor Ramazzini, of Padua, as early as 1700, and his monograph was translated into English in 1705, and also into French in 1777.

In 1810 the French Government issued a decree relating to "etablissements dangereaux, insalubres et incommodes," and in 1815 the English Parliament instituted a commission to inquire into the condition of factories, etc. In 1822 Mr. C. Turner Thackrah, of Leeds, wrote a monograph "On the Effects of the Arts, Trades, and Professions, and of Civic States and Habits of Living on Health and Longevity." In 1833 and 1865 the English Parliament again appointed commissioners, and in 1839 the "Academie des sciences morales et

politiques de France," and subsequently Bavaria, Prussia, and the German Empire directed similar investigations. As a result of these efforts and numerous independent investigations, it is known to-day that persons habitually engaged in hard work, especially in factories and indoors, present a greater amount of sickness and higher mortality than persons more favorably situated, and that the character of the occupations influences to a great extent not only the average expectation of life, but also the prevalence of certain diseases.

It is known, for example, that bronchitis, pneumonia, and tuberculosis are much more frequent in dust-inhaling occupations, and that the sharp angular particles of iron and stone dust are more liable to produce injury of the respiratory passages than coal, flour, grain, and other kinds of dust. It is also known that workers in lead, mercury, arsenic, phosphorus, poisonous dyes, etc., suffer especially from the injurious effects, and that other occupations, such as mining, railroading, and those which necessitate working with or around moving machinery involve special danger to life and limb.

For these reasons workers in many industries need special protection, and in order to render this efficient it must be provided for by the enactment and enforcement of suitable laws. In 1833, 1864, 1867, and 1870, England enacted the so-called "factory laws." France provided a child-labor law in 1841 and in 1874 a more satisfactory labor code. Germany and other continental governments enacted suitable legislation between 1859 and 1886.

According to Miss S. S. Whittelsey's "Essay on Massachusetts Labor Legislation," child labor received attention in Massachusetts as early as 1836. The first law as regards safety and sanitation was enacted in that State in 1877, since which time all the States and Territories have enacted some form of labor or factory laws.

OCCUPATIONS AND MORTALITY.

According to the United States census for 1900, of 360,739 males, 10 years of age and over, dying in the United States during the census year, 278,147, or 77 per cent, were reported as having a gainful occupation. Of females 10 years of age and over, there were 324,075 deaths and 45,491, or 14 per cent, were reported as having a gainful occupation. In the aggregate the table on page cclx gives information as to the mortality by occupations for 5,575,745 males and 1,587,874 females.

The death rates by occupation groups are as follows:

Occupation.	Population.	Deaths.	Death rate.	
			1900.	1890.
Males:				
All occupations	5,575,745	88,815	15.0	13.8
Professional	208,104	3,109	15.3	15.7
Clerical and official	424,781	5,716	13.5	9.8
Mercantile and trading	498,994	6,000	12.1	12.3
Public entertainment	87,888	1,350	15.4	14.5
Personal service, police and military	149,164	1,981	12.9	15.4
Laboring and servant	800,893	16,158	20.2	22.6
Manufacturing and mechanical industry	1,796,928	24,769	13.8	13.0
Agriculture, transportation, and other outdoor pursuits	1,528,241	24,196	15.8	12.1
All other occupations	90,662	586	6.5	.....
Females:				
All occupations	1,587,874	13,203	8.3	10.5
Nurses and midwives	41,912	397	9.5	11.2
Servants	403,801	6,920	17.1	18.2

Each of the eight large groups of occupations is subdivided, and detailed information is given in 60 specified groups of employment for males, and in 14 groups for females, of which we have produced only 2 for females, on account of their high death rate.

Unfortunately we have no reliable occupation mortality statistics, and never will have until greater attention is given this subject by health officials and the Census Bureau.

In view of the importance of the subject and the tendency elsewhere toward a more detailed classification and information for industries and trades, Mr. Frederick L. Hoffman* says:

> It was reasonably to be expected that the census report of 1900 would materially increase the number of specific occupations dealt with in the section discussing the relation of occupation to mortality, but instead of 89 employments discussed in the census of 1890 only 60 are dealt with in detail in the census of 1900. To make this matter worse, the details are not given in the fundamental tables, but a vast majority of heterogeneous employments are grouped in a purely arbitrary manner, filling space to no advantage, and resulting in conclusions of no practical value.

He very properly objects to grouping together miners and quarrymen, because according to the census of 1890 the comparative mortality figure of quarrymen was 469, while that for miners was given as 1,127; "and to combine two such unlike occupations is the mere production of a figure which has absolutely no determining value, but the use of which must lead to false and mischievous conclusions." For like reason he objects to the grouping together of fishermen, oystermen, sailors, and pilots, which he very properly regards as three well-defined groups of employment. The mortality figure in the census of 1890 for fishermen and oystermen was 543; for pilots it was 630, and for sailors, 2,276. Many other combinations of employments, such as hotel keepers and boarding-house keepers, or saloon keepers with restaurant keepers are objectionable, as it does not enable the student of social questions to determine the effects of alcohol upon longevity. If, for example, restaurant keepers, who very generally do not engage in the liquor traffic, had not been combined with saloon keepers, bartenders, etc., the death rate of this group might not be so favorable but be more in accordance with the excessive mortality rates observed in this class in other countries. Mr. Hoffman points out that during the five years 1891–1895, during a condition of peace, the death rate of the United States army was 6.6 per 1,000, and for the navy 8.3 per 1,000, and concludes from this that soldiers and sailors should not have been combined. We quite agree with him, as there is reason to believe that the factor of environment, such as close sleeping quarters and dampness, influence the life of sailors adversely. He also refers to a number of misleading occupation death rates, because no correction is made for the difference in age distribution in widely different employments. As a result "the published rates do great injustice to employments entirely healthy, while giving favorable position to employments the health conditions of which are quite the opposite. This point is readily illustrated, if comparison is made of the mortality of farmers and printers, the former of which according to the census experi-

* Quarterly Publication of the American Statistical Association, December, 1902, p. 172.

enced a mortality 'at all ages' of 17.6 per 1,000, against a death rate of 12.1 per 1,000 for printers. Hence, apparently, printers enjoy a much lower mortality than farmers. Of course the opposite is the case. The inaccuracy of the rates is the result of radical differences in the age distribution of the two employments, there being 11.5 per cent of farmers at ages 65 and over, while among printers there are only 1.5 per cent living at this age period. * * * When proper comparison is made, the mortality in farmers is considerably below that of printers at all periods of life."

Mr. Hoffman's suggestions for improving vital statistics are worthy of careful consideration. The present chief statistician of the division of vital statistics, Doctor Wilbur, is a trained physician, a keen student of social, sanitary, and industrial questions, and perfectly familiar with the literature and the results achieved by more accurate and scientific methods of the treatment of the subject elsewhere. We may, therefore, confidently expect more definite data concerning the relative danger incident to various occupations.

MORBIDITY AND MORTALITY OF WAGE-EARNERS.

The statistics of the morbidity and mortality of various occupations, while far from satisfactory and subject to more or less erroneous conclusions, nevertheless indicate that persons habitually engaged in hard work are more frequently subject to disease and present a higher mortality than persons more favorably situated; and this is especially true of factory employees, because their work is generally more monotonous, fatiguing, performed under less favorable surroundings, and they are too often also badly nourished and badly housed.

Rohé, in his "Text Book on Hygiene," presents a table of a large number of persons in the State of Massachusetts whose occupations were specified, the total number of decedents was 144,954; the average age at death was 50.9. From this tabulation it appears that farmers and gardeners have the greatest expectation of life, with an average of 65.29 years:

	Years.
Active mechanics:	
Outdoors	56.19
Indoors	47.57
Inactive mechanics in shops	43.87
Professional men	50.81
Merchants, financiers, agents, etc	48.95
Laborerers without special trades	47.41
Factors, laboring abroad, etc	36.29
Employed on the ocean	46.44
Females engaged in wage-earning occupations	39.13

Among the occupations usually classed as inimical to health are bleachers, bookbinders, brass founders, compositors, coppersmiths, electrotypers, stonecutters, gas-works employees, white-lead workers, match workers, persons employed in the manufacture of explosives, firemen, potters, file makers, and rubber-factory operatives.

The following table from the reports of the Twelfth Census shows the death rates per 1,000 for leading causes and for all causes in certain occupations in 1900:

Death rate per 1,000 employees in certain occupations in registration States in 1900, by principal causes of death.

Occupation.	Death rate per 1,000.						
	Tuberculosis of lungs.	Diseases of nervous system.	Heart disease.	Pneumonia.	Diseases of urinary organs.	Accidents and injuries.	All causes.
MANUFACTURING AND MECHANICAL INDUSTRIES.							
Bakers and confectioners	2.50	1.60	1.02	1.17	1.45	0.61	12.3
Blacksmiths	2.12	2.99	1.90	1.68	1.90	1.00	18.3
Boot and shoe makers	1.35	1.50	1.45	.95	.78	.33	9.4
Brewers, distillers, and rectifiers	2.56	2.74	2.22	2.40	2.56	1.87	19.7
Butchers	2.87	2.80	1.77	1.72	1.36	.81	16.1
Cabinetmakers and upholsterers	3.59	2.21	1.61	1.78	1.57	.64	18.0
Carpenters and joiners	2.31	2.45	2.23	1.46	1.73	1.18	17.2
Cigar makers and tobacco workers	4.76	1.79	1.75	2.15	1.68	.70	18.7
Compositors, printers, and pressmen	4.35	1.80	.93	1.15	.93	.49	13.1
Coopers	2.99	2.90	2.72	2.09	3.08	1.26	23.3
Engineers and firemen (not locomotive)	2.29	2.08	1.80	1.77	1.66	1.83	15.7
Iron and steel workers	2.36	.91	1.01	1.81	.77	.78	10.7
Leather makers	3.11	1.01	1.26	1.32	.44	.66	12.3
Leather workers	2.27	2.67	2.11	.97	2.27	.97	17.5
Machinists	1.96	1.24	1.03	1.10	.98	.71	10.5
Marble and stone cutters	5.40	1.10	1.59	1.37	.53	.99	14.9
Masons (brick and stone)	2.98	2.26	2.32	2.30	1.83	1.57	19.9
Mill and factory operatives (textiles)	2.07	.84	.90	.80	.57	.76	8.9
Millers (flour and grist)	1.96	4.47	3.81	2.97	1.16	1.96	26.6
Painters, glaziers, and varnishers	3.19	2.18	1.69	1.84	1.82	1.28	16.2
Plumbers, and gas and steam fitters	2.94	.90	.59	1.13	.86	.76	9.1
Tailors	2.18	1.43	1.28	1.13	1.38	.51	11.8
Tinners and tinware makers	3.65	1.77	1.36	1.37	1.31	.91	14.6
AGRICULTURE, TRANSPORTATION, AND OTHER OUTDOOR.							
Draymen, hackmen, teamsters, etc.	2.61	.89	.95	1.47	.99	1.33	11.0
Farmers, planters, and farm laborers	1.11	2.70	2.62	1.49	1.70	.....	17.6
Miners and quarrymen	1.20	.....	.....	.77	.....	3.78	9.6
Steam railroad employees	1.29	.95	.88	.60	.64	4.10	10.2

The following table from the report of the registrar-general of England and Wales shows the comparative mortality of occupations in England and Wales 1890-1892. The average mortality of all males of the population between 25 and 65 years of age was placed at 1,000. The mortality of occupied males was 953 and of the unoccupied 2,215. The comparative mortality of the different groups was as follows:

Occupation.	Comparative mortality.	Occupation.	Comparative mortality.
Clergymen, priests, ministers	533	Bricklayer, mason, builder	1,001
Gardener, nurseryman	563	Butcher	1,096
Farmer, grazier	563	Printer	1,096
Schoolmaster, teacher	604	Plumber, painter, glazier	1,120
Grocer, etc.	664	Cotton manufacturer, Lancashire	1,176
Carpenter, joiner	783	Carman, carrier	1,284
Barrister, solicitor	821	Slater, tiler	1,322
Fisherman	845	Brewer	1,427
Shopkeeper	869	Innkeeper, hotel servant	1,659
Medical practitioner	966	Potter, earthenware manufacturer	1,708
Tailor	989	File maker	1,810

A reasonable explanation for the excessive mortality in some of the occupations will be found in subsequent pages; the high rates in brewers, innkeepers, and hotel servants are believed to be due to the effects of alcohol.

According to Rauchberg* the average number per 1,000 members of the "Vienna Sick Benefit Society" taken sick during a period of seventeen years was 423 per annum, distributed as follows:

Occupation.	Average number taken sick per 1,000 members.	Occupation.	Average number taken sick per 1,000 members.
Assistant machinists	488	Ironworkers	351
Factory employees and day laborers	477	Shoemakers	343
Foundrymen	473	Tinners and bronzers	339
Blacksmiths	451	Cabinetmakers and wood workers	326
Masons and stonecutters	437	Saddlers	282
Painters	378	Tailors and furriers	215
Weavers and spinners	367	Other mechanics	468
Locksmiths	354		

Industrial diseases and industrial accidents are everywhere assuming more and more importance, and our knowledge should be based upon accurate data. In countries like England, where reports of certain occupations are compulsory, it is quite possible to secure, for example, reliable data as to the number of cases of lead poisoning. The same may be said of the facilities afforded by the statistics of the "German Industrial Insurance Institutes," which furnish not only the number of deaths, but also the number of cases treated, together with the age period and the duration of the disease. Similar facts should be collected in this country. This is all the more important when it is remembered that even with the most complete statistics, it is extremely difficult to determine all the factors which influence the health and longevity of operatives. Great differences are found in the conditions under which the work is performed, some of which are entirely avoidable, while others are not, and it is hardly fair to characterize certain trades as dangerous when experience has shown that no harm results when proper safeguards have been taken. In the consideration of this question the personal element of the workmen, their habits, mode of life, food, home environments, etc., can not be ignored. There are a number of occupations in which the alcohol habit prevails to an unusual extent, perhaps because of the character of the work, perhaps as a result of association, and it would not be fair to attribute the ill health of the operatives altogether to the character of the employment. Again, many persons are engaged in occupations for which they are not physically fitted, while others ruin their health by vice, dissipation, improper food, and insanitary environments at home. In addition to all this there are factors, such as water and soil pollution, for which neither the industry nor the individuals are primarily to blame. Thus, for example, the general anæmia of the agricultural classes in Porto Rico was attributed a few years ago to their occupation and starvation, when as a matter of fact it was caused by the "hook-worm disease." Recent investiga-

*Die allg. Arbeiter-Kranken und Invalidencasse in Wien, 1886.

tions conducted by Doctor Stiles appear to indicate that the same disease prevails to some extent among the textile operatives in the South. All this indicates the need of a thorough study of the conditions affecting health in various occupations, not only to determine the relative health risks and the causes of the undue prevalence of certain diseases in certain occupations, but also to formulate rules which may remove the causes or render the system better fitted to resist them. In this, as in all preventive efforts, a hearty cooperation of the parties interested is absolutely essential for the attainment of the highest measure of success. In this instance the responsibility rests with the State, the employer, and employees; each have certain duties to perform, and the help of all is essential for the mitigation of existing evils.

INDOOR OCCUUPATIONS.

Indoor employment, broadly speaking, is inimical to health, while outdoor work in a pure air favors health and longevity. Without underrating the influence of insanitary dwellings, improper and insufficient food, lack of recreation, and other factors, there is no doubt that one of the chief dangers of indoor life is exposure to vitiated air. The air of dwellings and workshops is never as pure as the outer air, because it is polluted by the products of respiration, combustion, and decomposition, and the presence of individuals also tends to vitiate the air with dust, germs, and organic matter from the skin, mouth, lungs, and soiled clothing. Unless proper provision is made for the dispersion of foul air and the introduction of pure air there is much reason for assuming that these impurities play a more or less important rôle in what has been designated as "crowd poisoning," characterized in the acute form by symptoms of oppression, headache, dizziness, and faintness, while the chronic effects of deficient oxygenation and purification of the blood are plainly evinced by the pallor, loss of appetite, anæmia, and gradual loss of physical and mental vigor. All of these effects are intensified when human or animal beings are obliged to occupy rooms with an air supply insufficient for the proper oxygenation of the blood, and as a result of this habitual exposure to vitiated air we note an undue prevalence of consumption in crowded workshops, dwellings, prisons, public institutions, and formerly also in military barracks and battle ships. Even live stock shows the baneful effects of insufficient air space, for tuberculosis among the range cattle of the far west, which are practically without shelter, is comparatively rare, while it affects from 15 to 25 per cent of dairy herds, which are housed, but without sufficient regard to light and air. Improved ventilation and increased air space have everywhere lessened the death rate, and it is chiefly by just such measures that the rate from consumption has been reduced from 11.9 to 1.2 per 1,000 in the British armies. As a matter of fact, an abundance of pure air has been found the most important factor in the treatment of tuberculosis, because it promotes oxygenation of the blood, stimulates the appetite and nutrition, and thereby increases the general resisting power of the system.

CHAPTER II.

OCCUPATIONS INVOLVING EXPOSURE TO IRRITATING DUST.

It has long been known that dust-inhaling occupations predispose to diseases of the respiratory passages, which may result in consumption. The particles of mineral dust produce an irritation of the mucous membrane of the nose, throat, respiratory organs, and eyes, and the hard, sharp, and angular particles of iron and stone dust may cause actual abrasions. According to Arnold[a] the dust which is inhaled lodges on the mucous membrane of the air passages and vesicles of the lungs, there to be coughed up, although some of the finest particles are taken up by the epithelial cells and white corpuscles and carried to the nearest lymphatic glands. The coarser particles, such as iron, stone, or coal dust, usually lodge upon the surface, to be coughed up with the secretions. If not expectorated they will cause harm by clogging up the air vesicles and interfere with respiration. In the meantime not infrequently an irritation is set up, causing catarrhal conditions of the mucous membrane, or a more serious chronic inflammation of the respiratory organs, so common among persons engaged in dusty occupations. The chronic inflammatory conditions thus produced favor infection with the tubercle bacillus. At all events, Hirt's statistics show that men employed in dust-producing occupations suffer much more frequently from pneumonia and consumption than those not exposed to dust and that there is practically no difference in frequency of disease of the digestive system. The relative frequency of these diseases per 100 workmen is as follows:[b]

Cases of Consumption, Pneumonia, and Digestive Disorders per 100 workers in certain occupations.

Workers in—	Consumption.	Pneumonia.	Digestive disorders.
Metallic dust	28.0	17.4	17.8
Mineral dust	25.2	5.9	16.6
Mixed dust	22.6	6.0	15.2
Animal dust	20.8	7.7	20.2
Vegetable dust	13.3	9.4	15.7
Nondusty trades	11.1	4.6	16.0

Perlen in his "Inaugural Dissertation," Munich, 1887,[c] discussed the records of the Munich Polyclinic, where 65,766 persons were treated between 1865 and 1885, including 4,177 tuberculosis patients, viz, 2,801 males, 1,263 females, and 83 children. Of these, 1,425 patients had been engaged in occupations where they were exposed to dust, as follows:

[a] Untersuchungen über Staubinhalation, etc., Leipzig, 1885.
[b] Cited by Harrington, Practical Hygiene, 1902, p. 678.
[c] Cited by Uffelmann, Handbuch d. Hygiene, 1890, p. 587.

Occupations exposed to—	Per cent.
Metallic dust	30
Vegetable dust	26
Mineral dust	18
Mixed dust	17
Animal dust	8

According to the reports of the census of 1900 the consumption death rate of marble and stone cutters in the United States is six times that of bankers, brokers, and officials of companies, and the mortality in 51 other employments ranges between these extremes.

The amount of dust is perhaps less important than the character of the particles which compose it. The susceptibility to consumption in metal workers and stonecutters can only be explained by the fact that the hard, sharp, and irregular particles of this kind of dust are more apt to produce injury of the mucous membranes of the respiratory tract. But it is not fair to assume that the less irritating dust is free from danger, for as pointed out by E. Roth [a] even the inhalation of plaster of Paris or flour dust can not be regarded with indifference, especially when it is preventable.

Ahrens [b] found the amount of dust for each cubic meter of air in certain industrial establishments as follows:

	Mg.		Mg.
Horsehair works	10.0	Flour mill	28.0
Sawmill	17.0	Foundry	28.0
Woolen factory	20.0	Polishing room of foundry	71.7
Woolen factory with exhauster	7.0	Felt-shoe factory	175.0
Paper factory	24.0	Cement works	224.0
Laboratory	1.4		

According to Schuler and Burkhardt, cited by Roth, the morbidity among 1,000 workmen engaged in dusty occupations, is as follows:

Bookbinders	98	Paper-factory employees	343
Silk weavers	205	Mechanical industrial shops	419
Cotton spinners	235	Wood turners	427
Printers	250	Laborers in the rag storeroom of a paper factory	429
Cotton weavers	285		
Type founders and typesetters	304		

According to Sommerfeld, cited by Roth, the mortality in Berlin of persons engaged in nondusty occupations is 2.39 per 1,000; of persons engaged in dusty occupations is 5.42 per 1,000; the mortality of the Berlin population at the same ages is 4.93 per 1,000.

Of 1,000 deaths the number of deaths from consumption in occupations without development of dust was 381; in occupations with development of dust it was 480; in the Berlin population at the same ages, 332.3.

METALLIC AND MINERAL DUST.

It will be readily understood that in the cutlery and tool industry, especially in the grinding and polishing departments, more or less dust is evolved not only from the metallic surfaces, but also from the numerous grindstones and emery and corundum wheels. This dust production is not wholly avoidable, even when the wet process is em-

[a] Kompendium der Gewerbekrankheiten, Berlin, 1904, p. 106.
[b] Archiv für Hygiene, 1894, Heft 2.

ployed. It is known that occupations involving the inhalation of this dust tend to produce diseases of the lungs, such as bronchitis, peribronchitis, and fibroid pneumonia, but tuberculosis, is also spoken of by the workmen as "grinders asthma" and "grinders rot," leads the list.

Moritz and Roepke[a] have shown that 72.5 per cent of the deaths among the metal grinders of Solingen are due to consumption, as compared with 35.5 per cent among the general population.

The death returns for twelve years of the city of Northampton, Mass., one of the centers of the cutlery and tool industry, show that among "grinders," "polishers," and "cutlers" diseases of the lungs were responsible for 72.73 per cent of the mortality, inclusive of 54.5 per cent of deaths from tuberculosis.[b]

Hirt gives the percentage of consumption in the total number of sick among different classes of workers in metal as follows: Needle polishers, 69.6 per cent; file cutters, who are also exposed to inhalation of lead, 62.2 per cent; grinders, 40 per cent; nail cutters, 12 per cent.

Greenhow[c] over fifty years ago called attention to the excessive mortality among the needle polishers of Sheffield. Beyer[d] found that of 196 needle polishers at Remscheid only 24 were over 40 years of age. The reason why this occupation is especially dangerous is because the "wet process" can not be employed for small objects, which moreover have to be brought more closely to the eyes, and thus the chances for the inhalation of this metallic dust are increased.

The danger in all such establishments can be reduced to a minimum by the employment of respirators and forced ventilation to carry the dust away from the operator. The Massachusetts report, cited above, states that "even when employers have provided hoods, connected with a system of exhaust fans or blowers, a very large proportion of grinders recklessly remove the hoods, and thus expose themselves unnecessarily to this especially dangerous form of dust. They assert that they prefer freedom of movement, with dust, to the protection offered by hoods."

Stonecutting is regarded as a dangerous occupation, and consumption is quite common among men engaged in the industry. Those who have witnessed the various operations realize that in spite of wet processes, and employment in the open air, the workmen are exposed to a great amount of this irritating form of dust, especially those who operate the pneumatic tools.

A collective investigation published in 1901, and cited by Roth,[e] shows that of every 100 deaths among stonecutters, polishers, and quarrymen 86 were due to diseases of the lungs, inclusive of 55 deaths from consumption. Of 2,013 stonecutters examined by Sommerfield, 19.7 per cent were afflicted with consumption; 17.98 per cent with other diseases of the lungs, and nearly all had a chronic catarrh of the throat or larynx.

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[a] Cited by Roth, p. 26.

[b] Report of the state board of health of Massachusetts upon the sanitary condition of factories, workshops, etc., 1907, p. 87.

[c] Cited by Sander, Handbuch der oeffentl. Gesundheitspflege, 1885, p. 100.

[d] Beyer, Die Fabrikindustrie des Reg. B. Duesseldorf, 1876.

[e] Kompendium der Gewerbekrankheiten, Berlin, 1904, p. 108.

According to the report of the board of health of Massachusetts, previously cited,[a] of 343 deaths which occurred in the city of Quincy, Mass., among stonecutters during a period of about sixteen years, 41.4 per cent were due to pulmonary consumption; 12 per cent to other diseases of the lungs; 12.8 per cent to diseases of the heart; 7 per cent to violence; and 26.8 per cent to all other causes.

Mr. Frederick S. Crum[b] calls attention to the excessive average mortality rate from consumption, 205.4, in Barre, Vt., which he attributes to the stonecutting industry.

Millstone and slate cutting are also regarded as dangerous occupations. Persons engaged in glass cutting and polishing are not only exposed to the inhalation of a sharp and irritating dust, but also to lead poisoning from the use of putty powder, which contains 70 per cent of lead oxide. In glass establishments in Massachusetts, where all the cutting and polishing is done by the wet method, no dust is perceptible, and the employees as a class appear to enjoy good health. Gem finishers also have a high consumption and sick rate. Workers in mica dust and bronzing powders used in the manufacture of wall papers, fancy souvenir cards, moldings, frames, etc., are predisposed to diseases of the respiratory passages, and the bronze powder in addition is liable to produce headache, loss of appetite, nausea, vomiting, and diarrhea.

It is said of the bronzing department of some of the lithographing establishments in Massachusetts that in spite of the exhaust ventilation the air is heavy with bronze dust most of the time.[c] "The boys who run the fine bronzing machines wear handkerchiefs over the nose and mouth. They look pale and unhealthy, and all show the characteristic green perspiration due to contact with bronze. The great majority of the employees appear to be healthy."

In the manufacture of machinery and metal supplies some of the operations involve exposure to dust, fumes, vapors, or extreme heat. In some of the processes, where emery wheels and revolving wire brushes are used, enormous amounts of fine steel and emery dust are given off, unless equipped with exhaust ventilating appliances. In a Massachusetts investigation covering 24 establishments the air of some of the rooms was found exceedingly dusty and about one-tenth of the occupants looked pale and sickly, and complained of the irritation of the air passages by the dust. The number of employees in these establishments ranges between 12,500 and 15,000. Some of the establishments were models in character as regards light, ventilation, and general sanitation. "The tumblers and emery wheels are provided with hoods and blowers which are effective and there is practically no dust. The rooms in which castings are dipped are properly ventilated and all fumes are effectively removed. All of the machinery is well protected."

One brass foundry was reported where the air was heavy with fumes, especially in winter, no mechanical ventilation being installed, and in which the workmen have occasional attacks of "brass foun-

[a] Page 79.

[b] Quarterly Publication of American Statistical Association, December, 1907, p. 465.

[c] Report of the State Board of Health of Massachusetts upon the sanitary condition of factories, workshops, etc., 1907, p. 80.

ders' ague." The following may be taken as a fair statement of the hygienic aspects of the machinery and metal industry: "While the nature of some of the processes is such as to warrant classification of this industry with the dangerous trades, the conditions under which the work is done are very largely responsible for the injurious effects on the health of the employees, and these conditions are to a considerable extent avoidable or at least susceptible of improvement."

The same Massachusetts investigation covered 14 iron and steel foundries and 9 stove foundries. In one establishment, the department in which the castings are sand blasted was found very objectionable, as the air was heavily impregnated with flying sand, which "gets into the mouth, nose, and eyes, and the employees suffer considerably from soreness of the last-mentioned organs." In another establishment this condition is very much ameliorated by a large flaring hood in the center of the room with upward-suction draft, the operatives wearing helmets with fine wire inserts to protect the eyes, and cloths underneath the helmets to protect the nose and mouth. In one of the stove foundries "the dust from the polishing and buffing process, in the absence of hoods and exhaust ventilation, is so thick that objects a few feet distant can not clearly be made out. Many men refuse to work in this establishment in the hot months on account of the excessive heat and general discomfort. In some instances, however, where the necessary protection is afforded by the employer, the men habitually remove the hoods and become covered with emery and iron particles."

In the crushing, grinding, and sifting process incident to the manufacture of emery, corundum, and sandpaper more or less fine dust is given off in spite of the fact that the machines are more or less completely inclosed. The emery and corundum industry must be classed among the trades intrinsically dangerous to health, on account of the peculiarly irritating character of dust. But as is the case with other dusty occupations, few of those employed can be induced to wear respirators.

Coal miners, charcoal men, firemen, chimney sweeps, etc., are exposed to constant inhalation of coal dust and soot, and though subject to chronic bronchial catarrh, consumption is not especially common among them.

VEGETABLE DUST.

Millers and bakers inhale flour dust, and according to Hirt 20.3 per cent of all the diseases in millers are pneumonia, 9.3 per cent bronchial catarrh, 10.9 per cent consumption, and 1.9 per cent emphysema (abnormal collection of air in the lungs). The tuberculosis death rate according to Schuler among millers in Switzerland is 3.75, as compared with 2.95 per 1,000 in the general population. Carpenters, joiners, cabinetmakers, etc., are exposed to wood dust, and the dust from hard wood is probably more injurious than that from softer kinds. Dr. E. J. Neisser[a] refers to a wooden-tool factory at Strassburg which in 1904 furnished 15 cases of sickness out of the 20 employees, with two hundred and eighty-eight days loss of work, distributed as follows: Diseases of the eyes, 1; of nose, 1; throat, 2; and diseases of the lungs, 6. The Massachusetts board of health

[a] Internationale Uebersicht ueber Gewerbehygiene, Berlin, 1907.

found that in the agricultural tool and implement industry a hard wood called "coca-bola," which is used for tool handles, evolves a very pungent and irritating dust, productive of inflammation of the eyes and skin. Some persons in the course of a week or two become accustomed to its effects, while others are obliged to discontinue work in the department.[a]

The medical inspector of Great Britain, according to Neisser, reported a number of toxic symptoms which occurred among persons engaged in the manufacture of weaver shuttles made from African boxwood. Investigation revealed the presence of an alkaloid in the wood, which acted as a heart depressant, producing a slow and intermittent pulse; headache, drowsiness, watering of the eyes and nose, difficulty in breathing, nausea, and weakness.

Laborers in grain elevators and grain thrashers inhale a very irritating dust, which may cause acute and chronic catarrh of the mucous membranes. Workers in tobacco suffer more or less from nasal, conjunctival, and bronchial catarrh and digestive and nervous derangements, and although the mucous membranes gradually become accustomed to the irritation of the dust and fumes, the occupation appears to be dangerous, as the consumption rate ranks next to that of stonecutters.

It is said that female workers in tobacco are more liable to miscarry; at all events Doctor Rosenfeld, cited by Roth (p. 166), found this to be true in Austria. Dr. E. R. Tracy, of New York, reports that 325 cigar makers' families visited by him had only 465 children, an average of 1.43 to each family, and feels disposed to attribute this to the frequent abortions among the female operatives. This experience is not confirmed by recent observations made in German tobacco towns like Giessen, for example (Neisser, p. 125), and more extended investigations are called for. Some authors maintain that tobacco dust exerts a protective influence against infective agents, and instance the fact that during the cholera epidemic of Hamburg in 1892 there were only 8 cases among the 5,000 resident cigar makers. The Massachusetts report previously cited, in discussing the cigar and cigarette factories in Massachusetts, refers (p. 49) to the spitting habit and the objectionable practice of finishing cigars with the aid of saliva. This practice was observed in more than one-third of the places visited, and in 18 factories the practice of biting off the end of the filler and inner wrappers with the teeth was also observed. The report reiterates the statement made to the legislature in January, 1905, as to the possibility of disseminating loathsome diseases through this practice. Such conditions certainly emphasize the necessity for the use of cigar holders.

TEXTILE INDUSTRIES.

Operatives in cotton and flax textiles are perhaps more subject to dust inhalation and various diseases of the respiratory and digestive organs than those of woolen mills. The Census Report of the United States for 1900 gives the death rate among 150,783 male mill and factory operatives (textiles) as 8.1 per 1,000, and of the 162,932 female operatives as 4 per 1,000. As pointed out by Mr. F. L. Hoff-

[a] Report of the State Board of Health of Massachusetts upon the sanitary condition of factories, workshops, etc., 1907, p. 89.

man, it would have been exceedingly interesting to learn the death rate among cotton, linen, wool, and silk workers. The phthisis death rate in 1892 in Belfast[a] with its 30,000 persons engaged in the linen industry was 4.1 per 1,000, against 1.4 for the whole of England and Wales, and 2.1 for Ireland. According to Schuler and Burkhardt, 1,000 linen spinners furnish annually 221.6 cases of sickness; 1,000 weavers 202.7, while female operatives suffer even more, the sick rate being 249.5 and 334.4 for the respective occupations.

Cases of sickness per 1,000 employees among spinners and weavers.

Disease.	Cases per 1,000 spinners.	Cases per 1,000 weavers.
Diseases of the digestive organs	58.7	103.4
Diseases of the respiratory organs	47.7	52.5
Diseases of the motor organs	29.6	21.2
Diseases of a constitutional character	22.9	31.6

Arlidge[b] gives a table showing the comparative frequency of the most important diseases in the case of 739 weavers, and of 676 persons following the several other branches of the cotton industry, such as winders, spinners, reelers, curlers, mill hands, grinders, etc., and who for convenience sake are designated by him as machine-room workers. The figures are based on 1,415 operatives who received treatment as in and out patients in connection with the Preston Hospital during a period of six years.

Disease.	Per cent of weavers treated for specified disease.	Per cent of machine-room workers treated for specified disease.
Phthisis	9.87	11.90
Dyspepsia	16.50	21.00
Bronchitis	32.34	31.30
Varicose veins and ulcers	11.23	6.80
Rheumatic affections	7.70	11.08
Uterine disorders and displacements	8.24	8.43
Neuralgia	2.84	4.43
Throat affections	1.89	2.51
Renal diseases	2.57	2.66
Epilepsy	1.49	3.40
Heart diseases	2.71	5.32
Debility	7.57	9.17
Anemia	2.43	2.50

It will be observed that the Swiss and English statistics both reveal an undue prevalence of the diseases of the respiratory and digestive organs. It has been suggested that the constrained position of weavers is to a large extent responsible for the undue prevalence of dyspepsia among the Swiss weavers, but other factors, like improper food, indoor life, and home conditions should be considered. This is apparent from the fact that the percentage of cases of dyspepsia among the

[a] G. H. Ferris, Journal of State Medicine, March, 1895.

[b] Arlidge. "The Hygiene, diseases, and mortality of occupations," London, 1892, p. 361.

English weavers is smaller than among machine-room workers. The constitutional disorders like anæmia, chlorosis, neuralgia, and debility are likewise due to a variety of causes, chief of which are vitiated air, resulting from defective ventilation of the workshops, overwork, insufficient or improper food, and insanitary homes.

Uterine derangements and displacements may very properly be attributed to general debility, overwork, and long standing in hot and moist workrooms, and, like varicose veins and ulcers and "flat feet," may be expected to develop in other occupations involving long standing. (See occupations involving constrained attitudes.)

The undue prevalence of pulmonary diseases among the textile operators can be accounted for by a number of factors, such as the presence of very fine cotton or flax dust or "flys" air vitiated by the products of respiration and combustion, the presence of infectious germs from the promiscuous expectoration habit; faulty life and home surroundings. Of these the presence of "fly" is doubtless a very important predisposing factor, since it is generally admitted that this dust acts as an irritant to the repsiratory passages, and sooner or later prepares the way for the invasion of the germs of tuberculosis, pneumonia, etc. Coetsem describes the so-called byssinosis or "pneumonie cotonneuse," but it is by no means settled whether in these cases we have to deal with a typical occupation disease, or with a specific infection, in which the inhalation of the cotton dust simply operates as a predisposing cause. It is very probable, however, that the habitual inhalation of this dust may produce disease of the lungs not necessarily tubercular.

Arlidge says:

> If inhaled longer, it reaches the bronchi, and sets up cough with white mucous expectoration. The cough will be for years chiefly a morning phenomenon on first rising, but it is also induced upon leaving the warm workroom. Fine fibers of cotton are found, on microscopical examination, in the sputum, and as these make their way into the pulmonary tissue they set up morbid action, resulting in increasing density of it on the one hand and of emphysematous expansion on the other. These morbid changes are accompanied by dyspnœa, wasting, and debility, but rarely with hemoptysis [spitting of blood], and together constitute a group of symptoms not inappropriately termed "industrial phthisis." Morover, intercurrent diseases of the lungs, such as acute bronchitis and pneumonia, often arise and terminate life, and true tubercular phthisis is no uncommon cause of death.

The chief requirements for the amelioration of existing conditions in the textile industry are efficient machines for the prevention and removal of dust. The utmost care should be taken to provide the most perfect methods so far devised for the removal of dust and for proper ventilation. The lighting should be good, both for day and night work, giving preference to electricity. The temperature and humidity of the rooms should be regulated, and children under the age of 14, or those with weak chests, should not be employed at all in the cotton mills.

In the textile industry in Massachusetts analysis of the death returns during the year 1905 from the three principal "mill towns" shows that although tuberculosis is one of the leading causes of death among mill operatives the general death rate of this class was by no means abnormally high, being, respectively, 7, 8, and 10 per 1,000. Tuberculosis caused, respectively, 32, 23.57, and 21 per cent of the deaths. It appears also that the general death rates of the cities whose

population includes the highest percentage of the textile operatives compare not unfavorably with those of certain other cities which are engaged in other kinds of manufacture or are more residential in character, in spite of the high rate of infant mortality which appears to be inseparably connected with mill populations everywhere.[a]

A source of danger is the presence of infectious dust from dried sputum in the air of different mill rooms on account of the indiscriminate habit of spitting.

The report also includes an excellent summary of the results obtained by an inspection of 93 manufacturing establishments and the conditions found in a certain proportion of weave and spinning rooms are tabulated as follows: (1) Poor light; (2) presence of carbon-dioxide and carbon-monoxide in the air; (3) nonregulation of artificial moisture (*a*) excess of moisture, undue heat or (*b*) no artificial moisture, excessive heat; (4) more or less dust ("fly" dust from sizing, etc.); (5) lack of cleanliness; (6) lack of provision for a plentiful supply of fresh air. In the majority of mills the toilet and wash rooms were found to be beyond criticism; but in not a few "the imperative need of improvement as regards structure, location, ventilation, and common decency" are pointed out. The number of accidents in textile mills, considering the large number of fast-running machines, is not large, during a period of almost five years at the Pacific Mills, with about 5,200 employees, amounting to 1,000 classified as follows:

Accidents to employees of the Pacific Mills, Lawrence, Mass., August 10, 1900, to July 13, 1905.

Killed outright	1
Fatally injured	1
Seriously injured (broken limbs or amputation necessary)	86
Slightly injured	910
Unclassified (suffered nervous shock, but physically uninjured)	2
Total	1,000

The underlying cause of injury is given as follows:

Careless manipulation	539
Deliberate carlessness (taking chances of being injured, such as cleaning machinery while running, etc.)	164
Inattention to surroundings	177
Carelessness of fellow-workman	51
Unforseen liability	60
Unclassified	9
Total	1,000

According to the factory inspector's statistics of the State of New York (cited by Frederick L. Hoffman [a]) for the five years ending with 1905, out of 3,140 accidents in textile industries, 36, or 1.1 per cent, were fatal. Of the total number of accidents 82.5 per cent caused temporary disablement and 16.2 per cent permanent disablement.

In 3 mills in Massachusetts devoted to the manufacture of twine, cordage, and gunny cloth from jute and hemp some of the workrooms

[a] Report of the State Board of Health of Massachusetts, 1907, p. 16.
[b] Bulletin Bureau of Labor No. 78. September, 1908.

are reported to be exceedingly dusty in spite of mechanical ventilation and open windows. "Many of the operatives wear thick bunches of fiber over mouth and nose as a protection. A fairly large proportion of the operatives show the effects of their employment, looking pale and sickly." In the room where the sisal hemp is fed into breakers the air is filled with dust. "In one of the establishments the employees in all departments look well and strong, although the air in some parts contained considerable dust."*

In 5 Massachusetts carpet and rug factories, employing about 6,000 persons, about 10 per cent of whom are between the ages of 14 and 16, the largest of these factories shows some departments in which poor light, excessive heat, moisture, and dust constitute objectionable conditions. In one room there was "so much fine cotton dust and fiber in the air that it is with difficulty one can see across. This dust is very irritating to the nose and throat." In one of the establishments the children are described as very small and poorly developed for their age "to be allowed to work ten hours and twenty minutes for five days in the week." In another factory "about one-tenth of the employees look sickly." The smallest factory employs 500 persons, "has good light, adequate ventilation, and commendable weave rooms, and the employees appear to be in good health."

One of the shoddy mills examined was poorly lighted, inadequately ventilated, dusty, and ill kept; the other was light, clean, and well ventilated. "Some of the women employed appeared to be in poor physical condition. In the 6 felt-cloth factories examined the work was found to be conducted in fairly lighted and, apart from dust, adequately ventilated buildings. In each there was more or less dust, especially in the picking and carding rooms; but the amount was much diminished in most of them by means of blower fans."

ANIMAL DUST.

Of the several classes of dust, that from wool is considered to be less irritating than flax or cotton, and horn is believed to be more irritating than bone. The conditions found in some of the woolen mills in Massachusetts as regards light, ventilation, and general cleanliness are reported as far from satisfactory; but in the absence of morbidity statistics it is difficult to determine the degree of danger to which the operatives are exposed. In the boot and shoe industry in Massachusetts, where there is more or less animal dust evolved, some effort is being made to remove the dust by exhaust flues attached to the machinery. Of the 373 factories summarized by the Massachusetts board of health report previously cited, "126 are partially, and a fair proportion of these are wholly, equipped with this means of protection; in 88 of these 126 one or more machines are not so equipped; and in 49 of the 88 there are rooms in which the air, apart from the escaping dust, is noticeably bad. The number of machines with means for efficient or fairly efficient removal of dust was found to be 1,630; the number either inefficiently equipped or devoid of equipment was reported as 2,769. * * * While in general the health of the employees appears to be fair to good, in 85 factories a considerable

* Report of the State Board of Health of Massachusetts upon the sanitary condition of factories, workshops, etc., 1907, p. 46.

proportion of them are noticeably pale and unhealthy in appearance." The pale and poorly nourished condition of youthful employees is also emphasized.

The dust and moisture involved in the polishing departments of the horn and celluloid industry, and the irritating fumes given off by a "dip" containing glacial acetic acid, are sources of possible injurious effects to the employees.

In the manufacture of derby and felt hats, apart from the exposure to dust from the fur which comes to the factory clipped from the skin, there is also a certain degree of danger from cyanide of mercury, with which the fur is treated. In 4 felt-hat factories inspected by the Massachusetts board of health, "the employees appeared to be healthy." In some of the establishments visited the fumes of wood alcohol in the drying department were markedly strong. "The workmen stated that they are frequently troubled with headaches, vertigo, smarting and burning of the eyes, and impairment of vision, and that few can remain at this work longer than three or four months at a time." This could readily be prevented by the use of "denatured" alcohol. In the "pouncing process," which consists in smoothing off the rough hairs from the hat rim and other parts, "a great deal of very fine dust is given off."

Mr. Frederick S. Crum[a] gives the mortality rate from consumption in Orange, N. J., as 289.9, as compared with the average of 151.0 for the 200 small cities investigated by him, and attributes this excess to the fact that in 1905 there were 1,379 employees engaged in the felt-hat industry in Orange.

In the brush-making industry hogs' bristles and vegetable fibers are used. In seven brush factories in Massachusetts "the general conditions were found to be beyond criticism and the health of the employees appeared to be fair or good."

Hirt regarded brush making as a dangerous occupation, as nearly one-half of the deaths among the brush makers were from consumption, due probably to the inhalation of the sharp fragments of bristles.

There are no adequate reliable data as to effects of animal dust given off in the manufacture of woolen goods, silk, feather, fur, hair, horn, bone, shell, ivory, etc. It is reasonable to assume, however, that the dust from all these sources is capable of setting up an irritation and inflammation of the respiratory passages, though not as intensive as that caused by mineral constituents of dust. In the hair, brush, and wool industry there is also some danger from disease germs.

CHAPTER III.

OCCUPATIONS INVOLVING EXPOSURE TO INFECTIVE MATTER IN DUST.

RAG, PAPER, WOOL, AND HAIR INDUSTRY.

It has been held for a long time that germs of infectious diseases like smallpox, anthrax, scarlet fever, tuberculosis, typhus and typhoid fever, diphtheria, measles, and cholera may cling to body and bed

[a] Quarterly Publication of the American Statistical Association, December, 1907, p. 464.

clothes and prove a source of danger to those coming in contact with rags in the rag business and paper industry.* The danger, while perhaps overrated, is nevertheless real and can be guarded against only by a thorough disinfection of the rags by steam under pressure before they are handled at the paper mills.

The occupation is evidently inimical to health. Of 4,857 German operatives reported by Uffelmann, 50 per cent are annually taken sick; about 34 per cent of those engaged in the handling of dry rags suffered from affections of the respiratory passages, and only 21.9 per cent of those otherwise engaged in the same establishments, all of which speaks strongly for the necessity of proper ventilation and exhaust flues for the removal of dust.

In this connection it is proper to refer to the dangers of the so-called "rag sorters'" and "wool sorters'" disease, which are nothing more or less than anthrax infection—a disease transmissible from animals to man by means of wool, hides, hair, and horsehair. Two hundred and sixty-one cases, with 67 deaths, were reported, according to Neisser, in England from 1899 to 1904. Of these, 88 occurred among those engaged in the wool industry, 70 cases among persons engaged in curled-hair and brush factories, 86 in persons engaged in tanneries and hide trades, and 17 in other industrial pursuits.

About 59 cases of anthrax infection were reported in different parts of Europe during the year 1905. Ravenal reported in three localities in Pennsylvania, during the summer of 1897, 12 cases among men and 60 in cattle, which were traced to a tannery handling imported hides from China. Nichols reported 26 cases occurring in persons employed in a curled-hair factory within three years.

The General Government recognizes the dangers by insisting upon the exclusion of rags, wool, and hides coming from infected districts during the prevalence of cholera, anthrax, and typhus fever and their proper disinfection at all times. While anthrax is not a very common disease among American domestic animals, local pustular infections and carbuncle are by no means infrequent, and might well be guarded against, as in some of the European countries, where recourse is had to disinfection of the raw material, special blower apparatus for the removal of dust, repeated disinfection of the premises, and prompt treatment of all slight wounds and abrasions.

The material from which paper is made includes rags, burlap, old paper, and wood pulp. The rags are chiefly imported from foreign countries, arriving in a baled condition, and after opening are subjected to a number of processes for the purpose of cleaning and disintegration. The "beating, thrashing," and "chopping" process is carried on by machines and is attended by the escape of more or less dust. The quantity naturally varies with the cleanliness of the stock. In the observations of about 80 establishments, the Massachusetts board of health found that with the usual grade of stock, no matter what kind of "duster" or "thrasher" is used, a considerable amount of dust is also evolved in the "chopping" process, and in spite of exhaust fans and dust pipes some dust will escape. The men engaged in the collection and baling of this dust are usually provided with

* The State of Maine requires evidence of successful vaccination in persons engaged in the rag industry or those employed in the manufacture of paper from foreign and domestic rags.

respirators. In a majority of the mills visited a proportion of the employees are exposed to an excessive quantity of dirt, dust, and lint, and in most of this majority the persons so exposed show not a few who are pale and sickly in appearance. A comparison of the death rate from tuberculosis, pneumonia, and bronchitis at Holyoke, the center of this industry in Massachusetts, with those of the State at large, showed "that the Holyoke rates were under rather than over the average."*

CHAPTER IV.

OCCUPATIONS INVOLVING EXPOSURE TO POISONOUS DUST.

LEAD DUST.

All occupations in which lead is employed and in which particles of lead may be inhaled, swallowed, or absorbed by the skin must be regarded as dangerous to health. Lead poisoning in its various forms, such as the lead habit, characterized by loss of weight, anæmia, sallow skin, a blue line along the gums, offensive breath, a sweetish taste and diminished salivary secretion, lead colic, lead paralysis, wrist drop, painful affections of the lower extremities, and other grave nervous diseases, is frequently seen in artisans. It attacks persons employed in the roasting of lead ores, in the manufacture of white and red lead, acetate and chromate of lead, china and pottery, artificial flowers; also painters, plumbers, varnishers, type founders, typesetters, file cutters, glass and gem cutters, electricians (especially those employed in charging storage batteries), persons engaged in enameling, dyeing, printing, working in rubber goods, weighted silk, and glazing of paper, and many other occupations involving the employment of lead.

Doctor Teleki, of Vienna, in 1906 reported several cases of lead poisoning in females and young girls, contracted in fringe making, the silk having been weighted by a solution of sugar of lead.

Of 999 employees in Prussian lead smelters during the year 1905, 177 suffered from lead colic or lead palsy, involving 3,056 days' loss of work; and of 4,789 engaged in zinc smelters, 50 of the employees, with 2,217 days' loss of work, were thus affected.

In Europe a most marked reduction in the morbidity and mortality has taken place during the past ten years, coincident with the enforcement of preventive measures. The number of cases of lead poisoning in England, where report is compulsory, has been reduced from 1,278 cases in 1898 to 592 cases in 1905. While most of the cases occurred in sugar of lead works and potteries, a considerable number were also reported in the other occupations already referred to. The percentage of severe cases in men was 23.9, as compared with 13.9 in females—perhaps because the latter have cleaner habits and possibly also stop work more promptly upon the appearance of the first symptoms.

In Paris it is estimated that over 30,000 persons are engaged in occupations involving exposure to lead, and of the 14,000 painters and varnishers employed there an average of 250 are treated annually in the hospitals for lead poisoning.

* Report of the State Board of Health of Massachusetts upon the sanitary condition of factories, workshops, etc., 1907.

File cutters are not only subjected to an irritant dust, but also to lead poisoning, because the file in cutting is being held upon a leaden bed "and particles of lead are inhaled with the dust and may also be absorbed by the fingers in handling the stiddy." The mortality figure for plumbism in 1890–1892 was no less than 75.[a]

The greatest danger in lead works is from inhalation of the lead dust and fumes; hence a special spray apparatus and exhausters have been designed, and employees have been taught to protect their hands with gloves and the mouth and nose with respirators.

In the pottery industry, where the danger arises from the glazes, the flux being made of litharge, clay, and flint, it has been found that the danger can be very much reduced by using only 8 per cent of carbonate of lead in the form of a "double-fritted silicate," instead of the older method, in which from 13 to 24 per cent of lead carbonate was employed.

Smoking should be forbidden during the working hours, and the work should be done in a special suit, frequently washed. The hands, face, and nostrils should be thoroughly washed with soap and water upon cessation of work, and the mouth and throat rinsed with a watery solution of tartrate of ammonia before eating and drinking. The same rules are applicable to painters, who would likewise find it of benefit to soften old paints with an alkali (weak lye) before scraping and to keep the handles of tools clean from deposits.

THE LEAD INDUSTRY IN MASSACHUSETTS.

The report of the Massachusetts board of health[b] gives a very complete account of the conditions which obtain in the manufacture of lead compounds in the several factories visited. "The men who attend the grinding machines are of a very different class from those who empty the stacks, and since they are not exposed to lead dust they do not suffer from lead poisoning and are comparatively healthy. Those who empty the stacks do not remain long at work. It is said that this is due in part to the disagreeable nature of the work, in part to the fact that they are largely roving characters, who do not care to work more than a few days occasionally, and in part to the fact that they acquire lead poisoning and are obliged to quit. Even those of good intentions rarely work more than a month."[a]

One establishment is referred to where white lead is made by the "wet process," with no evolution of dust, and there is no history of lead poisoning. In a "red-lead" factory, also, the general process is commended, especially the absence of appreciable amounts of dust, and the intelligence of the workmen, who are mindful of the dangers and who, with an experience of six to twenty-five years, appear well and strong. In one of the lead-oxide works more or less dust escapes into the air during the transfer to the mill and packing it into barrels. The men wear respirators, and each man washes carefully and changes all his clothes before leaving the establishment. In another establishment "all of the 40 employees appeared to be in good health, and the conditions everywhere were found to be commendable."

In the lead-pipe and plumbers' supplies factories the lead fumes are carried away by hoods and exhaust pipes, and in no instance was it possible to trace a case of lead poisoning to faulty methods. All of the employees observed the necessary precautions and appeared

[a] Dangerous Trades, Oliver, 1902, p. 138.
[b] Page 99.

to be in good health. In the manufacture of solder the same precautions are employed, and although in the establishment described, rats, cats, and dogs appear to succumb to lead poisoning, only one case of lead poisoning occurred among the employees in thirty-five years.

In the pottery industry it is said that lead poisoning is almost unknown in the six establishments visited; only two cases occurred a few years ago in girls who applied the glaze. A possible explanation for this gratifying contrast to conditions observed in French and English potteries may be found in the fact "that the persons engaged in this industry appear to be of good intelligence and understand thoroughly the importance of care and strict personal cleanliness, and that the employers provide ample means for its maintenance."

Wire and wire-cloth making as carried on in some of the plants visited in Massachusetts appear to be attended, in the opinion of Doctor Hanson,[a] by "avoidable dangerous conditions." "After the wire is hardened by being run into crude oil, it is passed through kettles of molten lead inside the tempering furnaces and is then finished and wound for shipment. From the tempering furnaces dense blue fumes arise and envelop the men whose work it is to feed and tend them. Occasional cases of lead poisoning occur in this department. In one establishment one of the employees of five years' experience shows the characteristic blue line of lead poisoning on the gums, and another of fourteen years' experience, in the same room, has a history of 'wrist-drop' and other evidence of chronic poisoning. Efficient mechanical ventilation is most necessary in this work, but it is not always provided."[b]

Doctor Hanson, evidently referring to the same factory, writes:

> All of the employees in this room worked eleven hours a day and had irregular hours for eating. There were no rules concerning the duties of the employers or those of the persons employed in order to avoid this serious danger. On the contrary, the hoods and blowers and top ventilators for the lead and other fumes were found to be distinctly inefficient, and over one large furnace there was no protection of any sort, the appliances having been broken years before and none renewed, so that all the fumes mingled at once with the air of the room.

In making shingle stains, pigments like chromate of lead, zinc oxide, iron oxide, and Prussian blue are used, and in the two establishments visited the men appeared to be careless in the matter of handling the pigments.[c] In the manufacture of paints, colors, and varnishes much of the work is done outdoors by men who have worked from six to twenty years; the man who makes the lead colors has worked seventeen years without sickness.[d] The last case of poisoning at this establishment occurred sixteen years ago, when a number of inexperienced men were poisoned with Paris green. In a color and mordant factory where aniline colors, logwood, starch, sodium dichromate, etc., are used, "about one in five of the employees is noticeably pale and sallow, and inflamed eyes were not uncommon." The latter condition is ascribed to the sodium dichromate. In the manufacture of "whiting" about half of the 58 men employed in three establishments visited "looked to be in poor condition."

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[a] "The effect of industry on health," Boston Med. Journal, No. 14, April 4, 1907, Wm. C. Hanson.
[b] Report of the State Board of Health of Massachusetts, 1907, p. 91.
[c] Page 106.
[d] Page 107.

PRINTERS, TYPE FOUNDERS, AND TYPESETTERS.

The mortality of printers in England is high, being 1,096 per 10,000, as against 953 for all occupied males and 602 for agriculturalists.[a] According to Schuler, of 1,000 Swiss type setters and founders, 304.7 are annually taken sick, and of printers 250. Diseases of the digestive organs predominate (78 per 1,000). Diseases of the respiratory passages come next (75 per 1,000). Sommerfeld states that among 38 occupations tabulated by him the printers occupy the fifth rank in the number of deaths from tuberculosis. Albrecht reports that the statistics of the Berlin Sick Benefit Insurance Company covering a period of thirty-three years show that 48.13 per cent of the deaths among printers are caused by consumption.[b]

This may be due in part to the fact that many weaklings engage in this occupation, but the work itself is often performed in most unfavorable environments and in an impure and dusty atmosphere, which has been found to contain traces of lead, arsenic, and antimony. Special attention should be paid to proper ventilation, and particularly to the collection and removal of dust from the type cases. One gram of this dust has been found to contain 57.7 mg. of lead, 186.8 mg. of antimony, and traces of arsenic.[c] Strasesr has suggested a type case with perforated tin bottom which is placed within another case, so as to facilitate the collection and proper disposition of this injurious form of dust.

A recent study of the "Health of Printers" by George A. Stevens, in the Twenty-fourth Annual Report of the Bureau of Labor Statistics of New York, based on the records of the International Typographical Union and the London (England) Society of Compositors, shows clearly the very high death rate from tuberculosis among printers.

The following table gives for the years 1901 to 1905 the annual death rates per 1,000 from the leading causes and from all causes among compositors in certain localities:

Annual death rate per 1,000 from principal causes and all causes among compositors in certain localities, for the five years, 1901 to 1905.

[From Twenty-fourth Annual Report of the Bureau of Labor Statistics, 1906.]

	Death rate per 1,000.							
	Tuberculosis of lungs and other respiratory organs.	Pneumonia.	Diseases of nervous system.	Diseases of genito-urinary system.	Diseases of the heart.	Diseases of digestive system.	Accidents and injuries.	All causes.
New York City	3.82	2.42	1.91	1.63	1.87	0.99	0.89	16.32
Other New York State	2.54	.97	1.49	.70	1.67	.97	.61	11.14
Total New York State	3.48	2.03	1.89	1.38	1.85	.98	.82	14.94
Chicago, Ill	2.42	1.57	1.04	.98	1.44	.45	.72	10.12
Philadelphia, Pa	3.65	.70	2.20	.70	1.39	.52	.....	12.35
All other United States	3.38	1.07	1.33	1.02	1.37	.74	.80	12.20
Total United States	3.34	1.30	1.44	1.08	1.89	.76	.64	13.63
London, England	3.69	.67	1.16	.51	1.97	.51	.19	12.19

[a] Dangerous Trades, Oliver, p. 151.
[b] Roth Kompendium der Gewerbe-Krankheiten, Berlin, 1904, p. 56.
[c] Roszahegyi, Archiv, fuer Hygiene, III, p. 522.

A second table gives for the same period the per cent of deaths due to tuberculosis in the selected localities for compositors and for all persons 20 years of age and over. It will be seen that in all the localities the percentage of deaths due to tuberculosis is very much higher for compositors than for all persons 20 years of age and over in the same community. For New York State outside of New York City and for London, England, the percentage for compositors is more than double that for the population 20 years of age and over as a whole.

Per cent of deaths from tuberculosis of the lungs and other respiratory organs of persons 20 years of age and over and of compositors in certain localities: 1901 to 1905.

[From the Twenty-fourth Annual Report of the Bureau of Labor Statistics of New York, p. cxxv.]

Locality.	Per cent of deaths in—					
	1901.	1902.	1903.	1904.	1905.	Five years.
ALL PERSONS 20 YEARS OF AGE AND OVER.						
New York City	17.7	17.7	17.6	16.5	17.4	17.4
Other New York State	11.4	10.9	10.6	10.6	10.6	10.8
Total New York State	14.5	14.2	14.0	13.6	13.9	14.0
Chicago, Ill	14.9	14.6	14.5	16.0	17.0	15.4
Philadelphia, Pa	16.3	15.5	15.8	16.3	15.9	16.1
London, England	14.9	13.9	15.3	15.0	13.6	14.5
COMPOSITORS.						
New York City	36.5	17.0	18.2	26.6	21.1	23.4
Other New York State	29.2	32.3	10.5	21.4	16.0	22.8
Total New York State	34.9	20.3	17.1	25.5	20.1	23.3
Chicago, Ill	26.9	28.0	28.0	7.7	33.3	23.9
Philadelphia, Pa	43.3	50.0	7.1	13.3	35.7	29.6
All other United States	31.1	29.9	24.0	26.0	29.2	27.7
Total United States	32.3	27.3	22.2	24.4	27.2	26.4
London, England	32.0	26.2	36.4	28.2	29.1	30.2

Mr. Stevens, in commenting on the high death rate from tuberculosis among compositors, says:

> Scarcely any other occupation furnishes so large a quota of victims from consumption. The domestic life of printers is parallel to that of other artisans in equal financial circumstances. As wages go in these days, they are fairly compensated for their labor, thus enabling them to have homes as healthful as may be procured by the best-paid workmen in any community. Neither can it be said that compositors are ill nourished and therefore rendered more susceptible to the insidious action of tubercle bacilli. The determining cause of their susceptibility to the harmful process of the "great white plague" lies in a different direction—to the neglect of sanitary precautions in far too many composing rooms.

With proper attention to sanitary conditions in the composing rooms the death rate from consumption could undoubtedly be very materially reduced. The excellent results that have come from improved sanitation in workrooms appears from the mortality statistics for 1905 of the National Organization of Printers in Germany. "The average membership of the union in that year was 44,236, of whom 283, or 6.40 per 1,000, died from all causes, while 134 of the total were affected with diseases of the respiratory system, from

which the death rate was 3.03,[a] tuberculosis not being separated in the tabular presentation."[b]

The regulations of the federal council of the German Empire which control sanitary conditions in German printing houses (put into effect July 31, 1897) will indicate the means by which such low death rates have been brought about. The regulations are given in full:

I. In rooms in which persons are employed in setting up type or manufacture of type or stereotype plates the following provisions apply:

1. The floor of workrooms must not be sunk deeper than half a meter (1.64 feet) below the ground. Exceptions may only be granted by the higher administrative authority where hygienic conditions are secured by a dry area and ample means of lighting and ventilating the rooms.

Attics shall only be used as workrooms if the roof is underdone with lath and plaster.

2. In workrooms in which the manufacture of type or stereotype plates is carried on the number of persons must not exceed such as would allow at least 15 cubic meters of air space (529.74 cubic feet) to each. In the rooms in which persons are employed only in other processes there must be at least 12 cubic meters of air space (423.79 cubic feet) to each person.

In cases of exceptional temporary pressure the higher administrative authority may, on the application of the employer, permit a larger number in the workrooms for at the most thirty days in the year, but not more than will allow 10 cubic meters of air space (353.16 cubic feet) for each person.

3. The rooms must be at least 2.00 meters (8.528 feet) in height where a minimum 15 cubic meters are allowed for each person, in other cases at least 3 meters (9.84 feet) in height.

The rooms must be provided with windows which are sufficient in number and size to let in ample light for every part of the work. The windows must be so constructed that they will open and admit of complete renewal of air in workrooms.

Workrooms with sloping roofs must have an average height equal to the measurements given in the first paragraph of this section.

4. The rooms must be laid with a close-fitting impervious floor, which can be cleared of dust by moist methods. Wooden floors must be smoothly planed, and boards fitted to prevent penetration of moisture.

All walls and ceilings must, if they are not of a smooth, washable surface or painted in oil, be lime washed at least once a year. If the walls and ceilings are of a smooth washable surface or painted in oil, they must be washed at least once a year, and the oil paint must, if varnished, be removed once in ten years, and if not varnished, once in five years.

The compositors' shelves and stands for type boxes must be either closely ranged round the room on the floor so that no dust can collect underneath, or be fitted with long legs so that the floor can be easily cleared of dust underneath.

5. The workrooms must be cleaned and thoroughly aired at least once a day, and during the working hours means must be taken to secure constant ventilation.

6. The melting vessel for type or stereotype metal must be covered with a hood provided with exhaust ventilation or chimney with sufficient draft to draw the fumes to the outer air.

Type founding and melting may only be carried on in rooms separate from other processes.

7. The rooms and fittings, particularly the walls, cornices, and stands for type, must be thoroughly cleaned twice a year at least. The floors must be washed or rubbed over with a damp cloth so as to remove dust once a day at least.

8. The type boxes must be cleansed before they are put in use, and again as often as necessary, but not less than twice at least in the year.

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[a] The corresponding death rate among compositors in New York City was 7.17; other New York State, 4.04; total New York State, 6.34; Chicago, 5.04; Philadelphia, 4.70; total United States, 5.02; and London, England, 5.50.

[b] Twenty-fourth Annual Report of the Bureau of Labor Statistics of New York; 1906, p. cxxxvii.

The boxes shall only be dusted out with a bellows in the open air, and this work shall not be done by young persons.

9. In every workroom spittoons filled with water, and one at least for every five persons, must be provided. Workers are forbidden to spit upon the floor.

10. Sufficient washing appliances with soap, and at least one towel a week for each worker, must be provided in or as near as possible to the workrooms for compositors, cutters, and polishers.

One wash hand basin must be provided for every five workers, with an ample supply of water. The wash basin after its use by each person must be emptied.

The employer must make strict provision for use of the washing appliances by workers before every meal, and before leaving their work.

11. Clothes put off during working hours must either be kept outside the workroom or hung up in wardrobes with closely fitting doors or curtains, which are so shut or drawn as to prevent penetration of dust.

12. Artificial means of lighting which tend to raise the temperature of the rooms must be so arranged or provided with counteracting measures that the heat of the workrooms shall not be unduly raised.

13. The employer must draw up rules binding on the workers, which will insure the full observance of the provisions in sections 8, 9, 10, and 11. In an establishment where as a rule twenty people are employed these rules shall be inserted in the general factory regulations, in accordance with section 134*a* of the industrial code.

II. In every workroom a notice must be posted, signed by the local police authority, attesting to the correctness of the statements concerning (*a*) the length, height, and breadth of rooms, (*b*) the air space in cubic measure, (*c*) and the number of workers permitted in each room.

A copy of rules 1 to 13 must be affixed where it can be easily read by all persons affected.

III. Provides for the method of permitting the exceptions named above in sections 2 and 3, and makes it a condition of reduction in cubic air space for each person employed as typefounder or compositor that there shall be adequate mechanical ventilation for regulating temperature and carrying off products of combustion from workrooms.

For an interesting report on plumbism and the health of employees in the Government Printing Office, Washington, D. C., by Wm. J. Manning, M. D., see Appendix A.

ARSENICAL DUST.

Arsenic is used in the manufacture of green pigments such as arsenite of copper (Scheele's green) and aceto-arsenite of copper (Schweinfurt or Paris green). These pigments are used in connection with wall paper, box and card factories, the cretonne industry, and artificial flowers, possibly also in other occupations. White arsenic is also used in the manufacture of shot, preservation of furs, and in taxidermy, and for many other purposes.

In the manufacture of arsenate of lead in Massachusetts no objectionable features were observed.[a] Reference has already been made to cases of poisoning with Paris green.

One of the factory inspectors of East London reported last year a number of cases of arsenical poisoning in persons engaged in the manufacture of a powder used in a "dip" for scabby sheep. The powder contained arsenic in large amounts, and was packed in a dry state in paper boxes. Arsenical dust may be inhaled, but more frequently absorption takes place through the skin, and causes a train of symptoms, characterized by derangements of the stomach, sore mouth, dry tongue, thirst, and a burning sensation in the throat. In the majority of instances the symptoms become chronic, lasting for

[a] Report of the State Board of Health of Massachusetts, 1907, p. 104.

months and years, and terminating in a general breakdown of the system, preceded by skin eruptions, obstinate ulcers, and inflammation of the peripheral nerves.

In the prevention of injurious effects special attention must be paid to wet processes; so, for example, the dusting of green pigments in the manufacture of artificial leaves and flowers from a dredging box is wholly unjustifiable. As a matter of fact, the use of arsenical pigments should be dispensed with by the substitution of coal-tar colors. The hands should always be protected with rubber gloves, the air passages with respirators, and strict cleanliness of the skin and clothing should be observed.

CHAPTER V.

OCCUPATIONS INVOLVING EXPOSURE TO IRRITATING OR POISONOUS GASES OR VAPORS.

A large number of occupations involve the inhalation of irritating and even poisonous gases and fumes. The danger may be very much reduced by proper factory sanitation, such as (1) condensation; (2) absorption by water or chemicals; (3) destructive distillation by heat in a closed vessel; (4) combustion of gases that can be burned; (5) forced ventilation and the discharge of gases into the air at a great height. In addition to these precautions much attention must be paid on the part of the operatives themselves to personal hygiene and the use of respirators. Many of the employees in so-called dangerous trades do not always avail themselves of the safeguards offered and are oposed to the use of respirators. We shall first briefly enumerate the less injurious, but nevertheless irritating, gases and fumes, like sulphur dioxide, hydrocholic acid, and nitrous fumes, ammonia and chlorine, which in small amounts cause more or less irritation of the air passages and a tickling cough, while in a more concentrated form they are productive of acute and chronic catarrhs and constitutional symptoms.

SULPHUR DIOXIDE.

This gas is believed to be a blood poison, on account of its affinity for oxygen. It is evolved in smelting works, match factories, and in the manufacture of sulphuric acid. It is is also used as a bleaching agent for cotton goods and straw hats and in the preparation of hops and dried fruit. The employees, if not primarily in good health, are said to suffer from respiratory and digestive disorders, heartburn, and pain in the stomach, and are frequently sallow and anæmic. A gradual tolerance may be established, and the danger is very slight if free ventilation is provided. When evolved in the open air, and hence largely diluted, it does not produce any injurious effects, except in very susceptible persons; indeed, the people around Vesuvius told Doctor De Chaumont that the sulphur fumes are good for their health.

The Massachusetts board of health found that, in the straw-hat factories visited in Massachusetts, "the employees are exposed to the sulphur fumes only when the doors are opened for the removal of the stock; but they do not enter until the fumes have escaped or have been driven out." The men do not wear respirators in this or the

other process of bleaching, which is done by immersion of the stock in a chemical water bath. The men who were interviewed state that "neither process causes anything more than a temporary irritation of the throat, and that many of them have worked in this department for many years."[a]

HYDROCHLORIC ACID.

Hydrochloric-acid vapors are evolved from alkali works and in the pickling process of galvanizing works or otherwise, and, apart from being destructive to vegetation around the immediate vicinity, are also very irritating, and even in small volumes may produce inflammation of the eyes and of the respiratory passages. In a more concentrated form they have produced caustic effects on the tips and edges of the tongue, ulcerations of the nasal wall and throat, bronchial catarrh, pneumonia, difficult breathing, and stupor. Lehmann[b] considers the extreme limit to which these vapors may be contained in the air 0.1 of volume per 1,000, and relates a case where even 0.5 per 1,000 produced unpleasant symptoms in a robust man. Pettenkoffer,[c] on the other hand, states that as much as 1 part per 1,000 can be borne by those accustomed to it. The workmen in galvanizing works are also subjected to fumes arising from the sal ammoniac thrown upon the molten zinc. These fumes are to some more insupportable than the acid fumes. Persons with bronchial troubles are often obliged to discontinue the work. In an investigation of three galvanizing establishments in Boston, the Massachusetts board of health found that in two the ventilation was efficient and the fumes were rapidly carried off. "The workmen in all three, about 60 in all, appeared to be in good health, and asserted that beyond sneezing and coughing at times they suffered no inconvenience or discomfort."

SULPHURIC AND NITRIC ACID.

The fumes of sulphuric and nitric acids probably produce similar effects. Eulenberg[d] believes, however, that the fumes of sulphuric acid produce no special bad effects, because they sink very readily and have a great affinity for the water in the air, so that they reach the system in a highly diluted form. He also points out that the nitrous fumes generated by contact of nitric acid with metals are more injurious, in that they produce a special predisposition to bronchitis, while pneumonia and diseases of the eye have also been attributed to these gases.

The workmen should be instructed to avoid the fumes as much as possible and to anoint the lips and nose within and without several times a day. Protection should be afforded by ample ventilation, and all processes involving the evolution of irritating or poisonous fumes should be carried on in the open air or in open sheds.

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[a] Report of the State Board of Health of Massachusetts upon the sanitary condition of factories, workshops, etc., Boston, 1907, p. 114.

[b] Lehmann: Archiv. fuer Hygiene, vol. I.

[c] Cited by Harrington.

[d] Eulenberg, Gewerbehygiene, p. 143.

According to the Massachusetts board of health[a] the corrosive acids are made in such a way that practically no fumes whatever escape, the work being inclosed from beginning to end. In one of the largest chemical factories in Massachusetts, where 300 men are employed, it is said that the workmen are exposed very little to poisonous or irritating fumes and dust or contact with poisonous or irritating substances. At certain points in the building acid fumes in considerable strength are constantly present, but at these points there is good overhead ventilation, and the workmen are rarely obliged to approach very near.

Among the products of the above-mentioned factories may be mentioned hydrochloric, sulphuric acid, nitric acid, acetic acid, ammonia, sodium sulphite, sodium sulphate, alum, potassium cyanide, ferrous sulphate, and other iron and sodium salts; also various salts of tin, arsenic, antimony, zinc, copper, etc.

AMMONIA.

Ammonia rarely causes any serious disturbance, except a temporary iritation of the respiratory tract, unless present in very large volumes. The amount which may be present, according to Lehmann, should not exceed 0.5 per 1,000. A large volume has been known to cause inflammation of the eyes and bronchial catarrh, while still greater concentrations, which fortunately are rare, may produce difficult breathing and emphysema.

CHLORINE GAS.

Chlorine gas is generally present in the manufacture of chlorinated lime, glazed bricks, and in bleaching operations, and is very apt to produce, when present in the proportion of 1 to 5 parts in 100,000 of air, a cachectic condition, asthma, bronchitis, caries of the teeth, and acne or pimples upon the face, while in a more concentrated form—40 to 60 parts in 100,000—it produces a violent cough and extreme difficulty in breathing.

Hirt describes these attacks as follows:

> In spite of the aid of the auxiliary respiratory muscles the entrance of the air to the lungs is insufficient, and the staring eyes, the livid lips, and the cold, clammy perspiration plainly show the mortal agony of the patient. The pulse is small and temperature decreased. These phenomena disappear upon removal to the fresh air, and a few hours later the workman is found enveloped in chlorine and hydrochloric acid vapors in his accustomed place in the factory. The attacks seem to be but rarely fatal, unless the volume exceeds 60 parts per 100,000.

BLEACHING ESTABLISHMENTS.

The Massachusetts board of health, in its summary of five bleacheries, with about 1,200 employees, speaks approvingly of the general arrangements for ventilation, and says:

> The odors of bleaching powders, although observable in each of the rooms where that substance is employed, were in no case so strong as to be disagreeable or to cause discomfort. In one of the establishments the persons exposed to the lint dust which escapes during unbaling and stitching together of the cotton cloth all looked pale and sickly.

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[a] Report of the State Board of Health of Massachusetts upon sanitary conditions of factories, workshops, etc., 1907, p. 103.

IODINE AND BROMINE VAPORS.

Iodine and bromine vapors may produce toxic symptoms. The fumes of iodine are liable to cause catarrhal conditions of the nose, eyes, and air passages, and frequent headaches, while chronic iodine poisoning produces a cachectic condition, wasting of the testicles, and loss of sexual power. Persons engaged in the manufacture of bromine are said to suffer quite frequently with a form of bronchial asthma, dizziness, and general weakness, while concentrated vapors have been known to produce spasm of the glottis and suffocation.

Bromine preparations are used to a considerable extent in photography. Schuler[a] describes three cases, one of which proved fatal, in men who prepared "brommetyl" from wood alcohol and sulphuric acid. In all of these three cases there were pronounced symptoms of nausea, spasms, and trembling of the extremities and diminished bodily temperature.

TURPENTINE.

Turpentine vapors in excess may produce gastric and pulmonary catarrh, slow and painful micturition and bloody urine, headache, roaring in the ears, and other nervous symptoms. Schuler observed among the workers in calico printing marked emaciation, loss of appetite, rapid pulse, and more or less headache, which he attributed to the turpentine vapors. In small doses no unpleasant symptons are observed. The odor of violets in the urine is one of its remarkable effects. The use of impure turpentine for cleaning purposes has been known to produce obstinate eczema of the hand.

PETROLEUM.

Concentrated vapors of coal are said to produce loss of sensation, and the workmen in refineries occasionally show symptoms like those observed in drunken persons, fall into a profound sleep, or suffer from loss of memory, dizziness, headache, and chronic bronchial catarrhs. Pustular, furuncular, and eczematous affections of the hands are also quite common in persons handling this and paraffin oil. The latter is also true of persons handling creosote and tar, unless protected by impermeable gloves. The dangers from explosions in the petroleum industry must also be guarded against.

BENZINE VAPORS.

Doctor Neisser, in 1907, reports an instance where three laborers in a carpet-cleaning establishment in which large quantities of benzine had been used were found unconscious upon the floor and had to be restored by oxygen inhalation. The toxic symptoms are similar to those produced by concentrated petroleum vapors, and the danger from explosions and fire are of course even greater.

CARBON MONOXIDE.

Carbon monoxide, or coal gas, when present in sufficient amount, paralyzes, so to speak, the red corpuscles by depriving them of their oxygen and combining with the hæmoglobin, which results in de-

[a] Deutsche Viertelj. f. œff. Gesundheitpflege, Bd. 31, p. 696.

ficiency of oxygen in the blood and serious toxic symptoms, which may end in death by producing a rapid parenchymatous degeneration of the liver, spleen, and heart. This gas is often present in gas and smelting works and around coke or charcoal furnaces, and one-fourth per cent by volume in the air will produce toxic symptoms, and more than 1 per cent is rapidly fatal to animal life. The workmen sometimes, though not as often as is supposed, suffer from the chronic form of poisoning, such as headache, dizziness, slow pulse, anæmia, general debility, and diseases of the respiratory and digestive organs. The acute symptoms of coal-gas poisoning are increased respiration and pulse, violent headache, dizziness, and roaring in the ears. These are soon followed by symptoms of depression, nausea and vomiting, numbness, drowsiness, muscular relaxation, paralysis, sighing respiration, slowness of the pulse and feeble heart action, dilatation of the pupils, diminished bodily temperature, and, if continued, convulsions, stertorous breathing, and death by suffocation. If death does not occur, the patient is apt to suffer for some time from headache, physical and mental depression, paralysis of speech and of the sphincters, convulsive twitching, and general muscular weakness, while pleurisy and pneumonia are also frequent.

CARBONIC-ACID GAS.

The chronic effect of carbonic-acid gas has already been alluded to. Well sinkers and miners are occasionally suffocated, owing to the presence of a large volume of this gas evolved from the soil and which has collected in deep shafts. It is one of the constituents of the "choke damp" in the mines and also present in cellars. It is also a product of fermentative processes, and the anæmic and debilitated conditions of miners, vintners, distillers, brewers, and yeast makers is believed to be partly due to an excess of carbonic acid, which diminishes the amount of oxygen in the air. The acute symptoms are loss of consciousness and locomotion, generally preceded by difficulty in breathing, headache, depression, drowsiness or mental excitement, sometimes convulsions. Prompt removal of the patient into fresh air will lead to rapid recovery.

CARBON DISULPHIDE.

Carbon disulphide is used in certain processes in the manufacture of vulcanized india rubber, and also in the extraction of fats, and may produce in those constantly exposed to it headache, dizziness, impaired vision, pains in the limbs, formication, sleeplessness, nervous depression, loss of appetite, etc. Sometimes, according to Delpech and Hirt, there is cough, febrile attacks, deafness, difficult breathing, loss of memory, paralysis of the legs and lower part of the body, loss of sexual power, which has been preceded by increased sexual appetite and mental exaltation.

NAPHTHA.

Naphtha is used in the same industries, and it is not improbable that the symptoms are produced by the combined influence of the two fumes. At all events, there are a number of authenticated cases

of acute naphtha poisoning characterized by dyspnœa, dizziness, and mental confusion, with vomiting, palpitation of the heart, and hemorrhages in the fatal cases. Necropsies reveal evidence of fatty degeneration of the heart, liver, kidneys, and other parts. The cleaners of woolen goods, etc., with naphtha not infrequently suffer from dizziness, nausea, vomiting, headache, sleeplessness, hysteria, and symptoms resembling alcoholic intoxication. (*See also* Dyeing and cleansing.)

NITROBENZOL.

Nitrobenzol, which is used in making aniline and in the manufacture of roburite and other explosives, produces headache, dyspnœa, drowsiness, dizziness, nausea and vomiting, great depression, stupor, and often terminates fatally.

The majority of workers in dinitro compounds in Great Britain[a] are anæmic and suffer from difficulty in breathing and general weakness. They are subject to a biweekly medical inspection and are enjoined (1) not to touch these compounds with bare hands; (2) to keep the feet in good condition (*a*) by bathing, (*b*) by shoes in good repair; (3) avoidance of alcoholic beverages; and (4) by thorough washing of the hands before eating and change of clothing upon quitting the work.

DYEING AND CLEANSING.

Among the chemical substances employed are naphtha, gasoline, wood alcohol, ammonia, various acids, bleaching agents, iron, copper, and other salts, aniline dyes and other dyestuffs.

The Massachusetts board of health reported of one large establishment investigated:

> In the naphtha-cleansing department, in spite of mechanical ventilation, there is a strong odor of naphtha, and all of the men here employed are pale and some of them very markedly sick looking.[b] In the room in which the naphtha-cleansed goods are dried, at a temperature of about 120° F., the naphtha fumes are very strong. Although the men who bring in the goods remain but a few minutes, some have occasionally been temporarily overcome by the fumes and have shown the characteristic excitement and hysterical symptoms of naphtha intoxication. At the time of visit, the man who does most of this work had been engaged thereat for three months and had experienced no ill effects.

RUBBER INDUSTRY.

The Massachusetts board of health investigated 14 rubber factories with about 9,000 employees.[c] It appears that naphtha has to a great extent replaced the more dangerous carbon disulphide as a vulcanizing agent, and in 11 of the 13 factories visited the odor of naphtha was noted as only slight. In two factories it was stated that "a few girls, new to the work, show the effects of naphtha and suffer from headache and sometimes nausea and vomiting, but that such girls do not long continue at the work. Naphtha fumes sometimes bring about a condition which much resembles alcoholic intoxication, and which occurs most often in the room where rubber is spread upon cloth. New men are

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[a] Cited by Neisser, 1907, p. 79.
[b] Report of the State Board of Health of Massachusetts, 1907, p. 109.
[c] Report of the State Board of Health of Massachusetts, 1907, p. 118.

especially susceptible, but even old hands have sometimes to leave their work at times for a breath of fresh air. * * * In 6 of the factories where litharge is handled, no history could be obtained of any case of lead poisoning. In two it was stated that cases occur, but not often. All of the establishments, with one exception, were found to be well lighted and adequately ventilated."

PATENT-LEATHER INDUSTRY.

The fumes of naphtha, amyl acetate, and wood alcohol, which are given off in the manufacture of patent leather, are dangerous. While no exact data are available, it is admitted by those in authority that many employees can not do the work on account of inability to withstand their influences.

ANILINE VAPOR.

Aniline vapor is dangerous to health when present in the air to the extent of 0.1 per cent. Hirt describes an acute form of poisoning from aniline vapor, which usually results fatally. "The workman falls suddenly to the ground, the skin is cold and pale, the face is cyanotic (bluish discoloration of the skin), the breath has the odor of aniline, the respiration is slowed, and the pulse increased. The sensation diminishes from the beginning of the attack, gradually entirely disappears, and death follows in a state of profound stupor."

The milder forms are characterized by laryngeal irritation, loss of appetite, headache, giddiness, and weakness, with a rapid, small, and irregular pulse, and diminished sensibility of the skin. In some instances short convulsions have occurred. Prompt fresh-air treatment is absolutely essential.

The chronic form of aniline poisoning may affect the central nervous system, and cause lassitude, headache, roaring in the ears, motor or sensory disturbance, or it may produce digestive derangements such as eructations, nausea, and vomiting, or it may affect the skin by causing eczematous or pustular eruptions and even well-defined ulcers. Doctor Neisser (1907) reports a number of such cases either in aniline factories or in dyeing works.

The medical inspector of Clayton, England, has presented a very interesting report[a] on the effects of aniline oil in black aniline dyeing works, and also the effects upon the skin of chromic acid and the bichromates of potassium and sodium in these establishments. He visited 20 establishments and examined 200 employees, many of whom suffered from anæmia, headache, digestive derangements, heartburn, dizziness, palpitation of the heart, loss of will power, and excessive mucous secretions, all of which were attributed to the toxic effects of aniline. He recommends as safeguards: (1) Mechanical suctional ventilation (*a*) at the machines where the cloth is being dyed, (*b*) at the machines where the cloth passes through the bichromate solution, and (*c*) at points where there is danger from the chromate dust; (2) protective clothing, and frequent washing of the working suits, lockers, and dressing rooms for street clothing; (3) special lunch rooms; (4) suitable wash rooms.[b]

[a] Neisser, p. 75, 1907.
[b] Cited by Neisser, p. 74.

WOOD ALCOHOL.

Vapors from varnishes have been known to produce blindness, due to inflammation of the nerves behind the eyeball, and partial atrophy of the optic nerve. Similar effects follow the internal use of wood alcohol, and even fatal cases have been reported in consequence of its substitution for pure alcohols. Doctor Neisser, in 1907, reports a large number of eczematous affections of the hands, arms, and face in furniture polishers ("polisher's itch"), which may possibly be caused by some of the impure alcohols.

CHROME PIGMENTS.

In the manufacturing and handling of chrome pigments, as in tanneries and various leather industries, a dust or vapor is involved which causes inflammation of the eyes and even ulceration of the nasal septum and elsewhere.

QUININE.

Quite a large percentage of the persons employed in the manufacture of quinine suffer from a dry form of eczema of the hands and face, which is claimed to be directly due to emanations from the boiling solution, as the disease disappears if the work is given up.

In the so-called "polisher's itch" and in the effects produced by chrome and quinine the use of rubber gloves and annointing the skin with some clean oil or grease have been found most useful.

MANGANESE.

According to Doctor Neisser (1907) a small percentage of the workers in manganese mills and dry pigments are affected with headache, dizziness, loss of appetite, constipation, loosening of the teeth, muscular pains, and general debility.

BRASS FOUNDERS.

The workers in brass foundries inhale a metallic dust or vapor of zinc or copper, or perhaps of both, which has given rise to a train of symptoms described as "brass founders' ague." The illness attacks about 75 per cent of those who are new to the work, or who resume work after an absence of a month or even a fortnight. There are more or less severe pains in the back, and general lassitude, which compels the patient to seek his bed. Usually after he has taken to his bed chilliness comes on, increasing to a decided rigor and lasting fifteen minutes or longer. In the course of an hour or less the pulse beats from 100 to 120 per minute, accompanied by a tormenting cough, corresponding headache, and soreness in the chest. After the lapse of a few hours free perspiration indicates the disappearance of the fever and the patient falls into a deep sleep, from which he awakens with perhaps only a slight headache and lassitude. In England the men who suffer this way drink freely of milk and promote vomiting—perhaps the best treatment for copper or zinc poisoning. A chronic form of zinc or copper poisoning, characterized by

oversensibility, formication, and burning of the skin of the lower extremities, tactile and motor disturbance, anæmia, cough, headache, neuralgia, digestive disturbance, and progressive emaciation, is said to occur among men who have worked for a number of years in brass foundries. At present it is not possible to say whether the symptoms of brass founders' ague are due to the copper, zinc, or arsenic, or a combination of all three. Some authors believe it to be a specific infection.

ARSENICAL FUMES.

Arsenical fumes are frequently given off in smelting processes, especially copper works, and, like those of arseniuretted hydrogen, may give rise to jaundice, headache, nausea, stiffness of the joints, general anæmia, discomfort, and malnutrition. When inhaled in concentrated doses the fumes produce symptoms of nausea, vomiting, languor, drowsiness, rapid pulse, frequent micturition, and bloody urine. In serious cases the pulse becomes small and thready, skin cold and clammy, and death ensues with evident signs of cardiac paralysis.

MERCURY.

The most important of the poisonous vapors in connection with dangerous trades are mercury and phosphorus. Workers in mercury suffer greatly from the effects of mercurial poisoning, such as salivation, tremor and nervous symptoms, and many fall victims to pulmonary tuberculosis. Miscarriages among the female employees are very common. These effects, according to Renk,* are due to the inhalation of mercurial vapors in badly ventilated workshops, while Wollner attributes them to the inhalation and swallowing of fine mercurial dust. Of 7,221 mirror makers at Furth during the year 1883, not less than 2,457, or 34 per cent, were taken sick, and of these 60 per cent suffered from mercurial poisoning. This danger has been practically eliminated in the mirror industry, but it is still pronounced in the manufacture of felt, thermometers, barometers, dry electric batteries, and bronzing. In Europe persistent efforts are being made to reduce the danger in these industries to a minimum, and some of the felt establishments no longer use the preliminary treatment of the hair with mercuric nitrate. The 64 cases reported in Great Britain in 1906 and cited by Neisser occurred as follows: Manufacturers of electric meters, 17; thermometers, etc., 16; felt and fur industry, 13; gilding, 7; chemical works, 7; powder works, 3; lithography, 1.

As preventive measures may be mentioned the following: (1) Change of clothing before and after work; (2) weekly washing of the working clothes; (3) systematic and frequent washing of the hands, weekly sulphur baths or frequent general baths, and gargling at the close of work with a solution of permanganate of potassium: (4) limit of work to eight hours per day and thorough ventilation of the rooms—open doors and windows; (5) frequent cleaning of floors with damp sawdust and sprinkling with a solution of ammonia.

* Renk Arbeiten aus dem k. k. Gesundheitsamte, V. p. 113.

PHOSPHORUS.

In the manufacture of phosphorus matches white and red phosphorus have been used. The danger consists in the inhalation of the fumes when the white substance is used, while the red or amorphous phosphorus is neither poisonous nor easily inflammable. The gas smells like garlic. The toxic symptoms in the acute form are difficult breathing and a feeling of intense anxiety. The fumes are only given off when the air contains moisture. The milder effects of phosphorus consist of gastric and bronchial catarrhs, anæmia, and malnutrition, followed occasionally by a painful inflammation of the bones of the lower or upper jaw, due to the local action of the phosphorus, and often beginning in carious teeth or in the alveolar process of missing teeth. The disease may develop during the first months, but generally not until four or five years after the beginning of the employment, and carious teeth, with toothache, are among the first symptoms, followed by swelling of the glands of the neck, alveolar abscesses, and necrosis of the jaws. Formerly from 11 to 12 per cent of the employees suffered. Since the use of red or amorphous phosphorus the danger has been greatly reduced. Only about 2 per cent of the operatives are now attacked.

Doctor Neisser reports that during the year 1906 several cases of phosphorus necrosis occurred in German match factories, in which the use of white phosphorus was promptly stopped.

The medical inspectors of Great Britain, from October 1, 1900, to October 1, 1905, reported only 11 cases of phosphorus necrosis, the reduction being attributed to improved factory sanitation.

The medical inspector of Belgium (quoted by Doctor Neisser, page 71) reports that during the last six years only one case of necrosis occurred, and the morbidity of the employees in match factories has also decreased coincident with factory sanitation, as shown by the following figures:

	1903.	1904.	1905.
Employees	1,114	1,182	1,226
Employees examined	7,061	8,511	9,003
Apparently healthy employees	757	1,055	1,061
Sick employees	387	127	165
Deaths	401	132	(a)

[a] Doctor Neisser states that the records do not disclose the fact whether or not there were any deaths during 1905.

The use of respirators, thorough ventilation, the disengagement of turpentine vapors to promote rapid drying and strict cleanliness, such as ablution of the hands, change of clothing, and gargling with weak alkaline solutions before eating and drinking are still in order as preventive measures.

BEET-SUGAR INDUSTRY.

In the beet-sugar industry, especially when the diffusion method is employed, an explosive mixture containing probably carbureted hydrogen has proved a source of danger to the operatives, and the waste waters are believed to be also a menace to public health.

CHAPTER VI.

OCCUPATIONS INVOLVING THE INHALATION OF ORGANIC GASES AND VAPORS.

Whether the effluvia from sewers, stables, stock yards, slaughtering and packing houses; glue, candle, and soap factories; hide depots, tanneries, fertilizer-making establishments, etc., are injurious to health remains an open question. Many authors insist that the olfactory organs are alone offended, and point to the mortality statistics, which indicate that the average age of such employees is quite high. Others hold that weaklings rarely engage in such occupations, and that the effluvia, consisting, as they do, of ammonia and sulphureted gases, are fully as injurious as the inhalation of sewer air, which, judging from experiments in animals, would appear to increase the susceptibility to infectious diseases by diminishing the power of resistance. Stift maintains that hydrogen and ammonium sulphides, chiefly derived from decomposition of animal matter and usually present in privy vaults, cesspools, and sewers, are blood poisons when present to the extent of about 1:4,000 volumes per 100. The same author believes that the inhalation of sulphureted hydrogen affects directly the terminal filaments of the pneumogastric nerve, and through these sets up an irritation of the respiratory and cardiac centers—in fact, of the entire medulla oblongata—and if continued sufficiently long induces paralysis of this function.

In sewer air the danger is intensified by the excess of carbonic-acid gas and deficiency of oxygen, and special precaution should be taken to exhaust the foul air before sewer employees or scavengers are allowed to descend.

The general effects of the foul odors upon those unaccustomed to work in the so-called "offensive trades" are nausea, vomiting, headache, loss of appetite, diarrhea, a general depression, and weakness. It is true the workmen become gradually accustomed to these emanations without any apparent injury, but even this does not justify the assumption that they are of no consequence.

Every community provides for the collection and disposal of dead animals, which is usually done by contract, and the animals are taken to some point beyond the town limits, flayed, and worked up, so as to utilize the skin, hair, bones, fats, horns, etc. There is, however, a certain element of danger from the transmission of infectious diseases like anthrax, glanders, and tuberculosis, and hence all such work should be done under strict sanitary control.

CHAPTER VII.

OCCUPATIONS INVOLVING EXPOSURE TO EXTREMES OF HEAT, SUDDEN CHANGES, AND ABNORMAL ATMOSPHERIC PRESSURE.

Exposure to extremes of heat and sudden changes is injurious and predisposes to a number of diseases. Stokers, cooks, bakers, blacksmiths, firemen, etc., are very apt to suffer from heat exhaustion and thermic fever (sunstroke). The duration of life is low, and rheuma-

tism, eczema, catarrhal affections, pneumonia, and diseases of the heart are quite common. Sailors, farmers, motormen, conductors, teamsters, coachmen, and many others are often exposed to sudden changes in the weather, and suffer quite frequently from rheumatism, catarrhal affections, pneumonia, and Bright's disease.

The effects of both heat and cold are intensified by extreme humidity in the atmosphere, and special precautions are necessary upon hot and sultry days and in cold, raw weather. Occupations involving exposure to dampness, especially when performed indoors, are injurious, because a cold, damp air abstracts an undue amount of animal heat from the body, lowers the power of resistance, and predisposes to catarrhal and rheumatic diseases. It is a well-known fact that damp houses favor the development of consumption.

CAISSON DISEASE.

The effects of compressed air on workmen in tunnels, caissons, deep mines, and diving bells were formerly attributed solely to increased atmospheric pressure, in consequence of which it was believed that the blood received not only an excess of oxygen, but by reason of the abnormal pressure was driven from the surface to the internal organs, causing congestion, especially of the central nervous system. It is now held that, while increased atmospheric pressure is capable of producing characteristic effects upon the circulation, such as pallor of the skin, ringing in the ears, bulging and possibly rupture of the ear drums, the most serious symptoms are produced when the pressure is too rapidly increased or removed by a faulty method of "locking in" and "locking out."

A commission of Belgian medical experts examined 166 caisson workers before and after their work, the shift lasting from eight to twelve hours, and found (1) that the blood-making function, as shown by the hæmoglobin contents, was actually increased during their work; (2) that so long as the pressure does not increase beyond 3 atmospheres (45 pounds) the men feel perfectly well and perform their labor with more ease and even less fatigue than under normal atmospheric pressure; (3) that men of temperate habits, with a sound heart, lungs, and nervous system, suffer no injurious effects, and none others should be employed; (4) the real injury is done by a sudden removal of atmospheric pressure in a hasty "locking-out" process, for which the workmen are often to blame.

The general rule in "locking out" should be to allow at least one minute for each 6 pounds of pressure within the chamber.

The symptoms of so-called caisson disease are rarely observed until the pressure equals 20 pounds, and usually do not appear for some minutes or hours after emerging. In addition to the symptoms already mentioned, there may be hemorrhage from the nose, mouth, and ears; headache, dizziness, rapid pulse, sweating, severe pain in the back, extremities, or region of the stomach, and vomiting. Partial deafness and symptoms of motor paralysis, more or less general, but most frequently confined to the lower extremities, are frequently observed. Cases with pronounced head and spinal symptoms usually prove fatal. The milder cases, as a rule, recover sooner or later, although the muscular pains and paralytic symptoms may persist for weeks, or even longer.

Chapter VIII.

OCCUPATIONS INVOLVING CONSTRAINED ATTITUDES.

The effects of a constrained position, combined with a sedentary life, are very injurious. This is especially seen in weavers, shoemakers, engravers, watchmakers, tailors, lithographers, etc., all of whom are obliged to assume a more or less constrained attitude, which interferes with a proper distribution of the blood supply and is liable to be followed by internal congestions. But perhaps the greatest harm results from deficient movement of the chest and consequent interference with normal respiration. As a matter of fact, many of these artisans suffer from phthisis, constipation, dyspepsia, and hemorrhoids, and all have a low average duration of life.

Among the apprentices of bakers, deformities such as "flat foot" and "knock-knee" and varicose veins of the lower extremity are frequently seen, as the result of being on their feet too long. Varicose veins and ulcers are quite common among motormen and conductors, while bakers, cabinetmakers, and others are also very liable to develop abnormal curvature of the spine.

Chapter IX.

OCCUPATIONS INVOLVING OVEREXERCISE OF PARTS OF THE BODY.

Among the diseases due to the excessive use of certain muscles may be mentioned the affection called "writer's cramp," which is a convulsive affection of the fingers. Similar fatigue neuroses, characterized by localized paralysis and twitching, are observed in copyists, typewriters, telegraph operators, pianists, violinists, engravers, seamstresses, cigar makers, etc.

Pulmonary emphysema is quite common among performers on wind instruments. Boiler makers' deafness and mill operatives' deafness may also be mentioned. The former is believed to be due to their constant exposure to an atmosphere in a state of violent vibration, while the latter affection is characterized by an inability to hear distinctly except during a noise. Public speakers and singers are apt to suffer from chronic affections of the throat and paralysis of the vocal chords, and watchmakers, engravers, and seamstresses, as well as all others who use their eyes upon minute objects, are more liable to suffer from nearsightedness and other visual defects.

Tobacco testers are apt to suffer from nervous symptoms and serious visual defects, and tea tasters soon become the victims of muscular tremblings and other nervous symptoms, the result of a chronic "theine intoxication."

Chapter X.

OCCUPATIONS INVOLVING EXPOSURE TO MACHINERY, ETC.

Life insurance and accident policy statistics plainly indicate the danger of occupations which involve contact with machinery. This may be the result of individual carelessness or the negligence of others. Not infrequently accidents are the result of boiler explo-

sions, circular saws, belting, and flying fragments, and are due to a lack of proper safety devices. As might be expected, many of the accidents befall children and inexperienced persons and take place at night or in badly lighted establishments. Roth calls attention to the accident statistics of the German Empire for 1897,[a] which clearly indicate that accidents increase with mental and muscular fatigue. Upon the assumption that there is one accident for every three working hours during the year, the average number of industrial accidents in the forenoon between 6 and 9 o'clock was 1.10; between 9 and 12 o'clock, 2.26; in the afternoon between 12 and 3 o'clock it was 1.02; between 3 and 6 o'clock, 2.11.

Professor Imbert at the International Congress for Hygiene and Demography at Brussels, 1903, from an abundance of statistical material arrived at a similar conclusion. According to Rubner[b] of 100 accidents, 41 befell children under 15 years of age, 36.4 befell persons between 15 and 25 years of age, 13.1 befell persons between 25 and 40 years of age, and 9.5 befell persons between 40 and 60 years of age. The upper extremities were involved in 87 per cent of the cases, the lower extremities in 7.5 per cent, and the head and trunk in 5.5 per cent. During the year 1899 there were in English factories 301 fatal and 19,321 nonfatal accidents, all attributable to machinery moved by mechanical power.[c]

Swiss statistics show that among 1,000 workingmen accidents occur as follows:[d] Cotton spinners, 2.22; millers, 28; paper manufacturers, 31.1; carpenters, 35.2; locksmiths, 46.9; brewers, 66.7; masons, 80.5; blacksmiths, 93.1; metal workers, 102.1; molders, 132.2.

According to the New York State statistics, cited by Hoffman,[e] for the five years ending with 1905, there occurred in the metal trades in that State 8,456 accidents, of which 135, or 1.6 per cent, were fatal, 6,397 caused temporary disablement, and 1,306 resulted in permanent disablement. In the chemical industries during the same period there occurred 1,339 accidents, of which 33, or 2.5 per cent, were fatal. Of the total number 91.1 per cent caused temporary disablement, and 6.3 per cent permanent disablement.

Many of the accidents to metal workers, masons, miners, weavers, etc., befall the eye, and Magnus attributes 8.5 per cent of all cases of blindness to accidents.

Of 48,262 accidents among British miners from 1884 to 1898, not less than 2,506, or 5.19 per cent, affected the eye.[f]

COAL MINING.

The mining of coal is, even under the best conditions, one of the most dangerous industries. A report of the United States Geological Survey[g] shows the number of men killed for each 1,000 employed

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[a] Ermuedung durch Berufsarbeit, Internat. Kongress fuer Hygiene und Demographie, Berlin 1907, Band II, p. 618.
[b] Lehrbuch der Hygiene, 6th ed. Leipzig & Wien, 1899-1900, p. 701.
[c] Dangerous Trades, Oliver, p. 203.
[d] Bergey's Principles of Hygiene, 1904, p. 276.
[e] Bulletin of the Bureau of Labor No. 78, September, 1908.
[f] Oliver, p. 776.
[g] Coal-Mine Accidents; Their Causes and Prevention. A preliminary Statistical Report. United States Geological Survey, 1907.

in the United States and in the four leading European countries, the figures being averages for five years.

Number of men killed for each 1,000 men employed—Averages for five years.

Country.	Number.
France (1901-1905)	0.91
Belgium (1902-1906)	1.09
Great Britain (1902-1906)	1.29
Prussia (1900-1904)	2.06
United States (1902-1906)	3.29

The following table from the same report shows the number of deaths from accident for every 1,000,000 tons of coal mined:

Number of men killed in coal mines per 1,000,000 tons of coal produced.

Year.	United States.	Great Britain.	Belgium.	France.
1902	6.79	.....	6.29	44.29
1903	5.62	*4.70	6.08	.29
1904	6.24	4.41	5.66	4.85
1905	5.97	4.64	5.64	4.17
1906	5.57	4.31	4.96	.....

* Average, 1894 to 1903.

The causes of the fatal and nonfatal accidents in the coal mines of the United States in 1906 were as follows:

Causes of coal-mine accidents in the United States, 1906.

Accidents due to—	Killed.	Injured.
Gas and dust explosions	228	307
Powder explosions	80	215
Falls of roof and coal	1,008	1,862
Other causes	732	2,192

An exhaustive analysis of mining accidents in the German Empire will be found in the Statistik der Knappschafts-Berufsgenossenschaft fur das Deutsche Reich, Berlin, 1897. The total number of persons insured for one year during the period covered (October 1, 1885, to December 31, 1894) by the work was 3,623,175; the total number of accidents of all kinds notified was 278,371, distributed as follows:

Total number of accidents of all kinds notified.

Class of accidents.	Number.	Per 1,000 persons employed.
Fatal accidents	7,721	2.13
Accidents causing total permanent disability	1,427	.39
Accidents causing partial permanent disability	14,347	3.97
Accidents causing temporary disability	8,164	2.25
	31,679	8.74
Minor accidents	246,692	68.39
Total	278,371	76.88

The causes of the fatal and serious accidents as calculated per 1,000 employees are given as follows:

Falls of rock, coal, falling bodies, etc	3.44
Transport, haulage, winding, loading, etc	2.26
Falls from ladders, steps, or other heights	.89
Explosions	.78
Machinery in motion, motors, etc	.51
Molten metal, hot and corrosive fluids, poisonous gases	.12
Miscellaneous	.74
Total	8.74

Mr. Henry Louis, in commenting upon these statistics in Oliver's "Dangerous Trades," page 516, says:

> Forty-one and six-tenths per cent, or two-fifths, of all the accidents could have been avoided by proper care and intelligent thought on the part of all concerned, and, in the second place, fully one-third of the accidents can be ascribed to the faults of the victims themselves.

According to Revue Scientifique [a] during the past fifty years there were no less than 503 mine explosions in Europe, with a loss of over 5,000 lives. The number of men killed in the coal mines of the United States is appalling, amounting to 22,840 during the seventeen years ending with 1906. In 1906 the total killed was 2,061 and about 5,000 injured.

In the introduction to the Report of the United States Geological Survey, already cited, on "Coal Mine Accidents: Their Cause and Prevention," [b] Mr. Joseph A. Holmes says:

> The figures given in this report indicate that during the year 1906 nearly 7,000 men were killed or injured in the coal mines of this country, and that the number of these accidents caused directly or indirectly by mine explosions has been steadily increasing. * * * The increase both in the number and in the seriousness of mine explosions in the United States during the past years may be expected to continue unless, through investigations made in the United States, such as have proved effective in other coal-producing countries, information can be obtained and published concerning the explosives used, the conditions under which they may be used safely in the presence of coal dust or gas, and the general conditions which make for health and safety in coal-mining operations.

According to English data, cited by Frederick L. Hoffman (Quarterly Publications of the American Statistical Association, December, 1902, p. 178), "for the period 1890–1892, at ages 45 to 54, the general death rate of all miners was 19.6 per 1,000, and of quarrymen 25.3 per 1,000. For coal miners alone the death rate at this age period was 19.4; for copper miners, 24.3; for tin miners, 32.2, and for lead miners, 23.9 per 1,000—indications of quite considerable differences in the mortality and specific disease liability of men engaged in the mining of coal and the different metals."

While tuberculosis is comparatively rare among coal miners, anthracosis (a lung disease produced by coal dust—"black lung"), miner's asthma, which is really a chronic bronchitis with emphysema, and simple chronic bronchitis are common affections. These diseases are largely influenced by defective ventilation, for Greenhow has shown that in the operatives of well-ventilated mines there is no excess of pulmonary diseases.[c]

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[a] 1875, II, p. 765.

[b] Page 4.

[c] Greenhow, third and fourth report of the medical officer of the privy council, 1860–1861.

Apart from large quantities of dust, the air of mines contains putrefactive gases from decomposing excrementitious matter, products of combustion, especially carbonic-acid gas, which is also one of the constituents of the "choke damp." In addition to all this, the "fire damp" (an explosive mixture of carbureted hydrogen with atmospheric air in the proportion of 6 to 10 volumes per cent) and the excessive temperature, real hard work, constrained attitude, and careless use of explosives add very greatly to the danger of miners.

Much can be done to prevent accidents by the introduction of safe hoisting cages, proper engineering, the use of suitable explosives, and adequate inspection laws, while Davy's safety lamps, incandescent electric lights, and copious ventilation will serve to prevent explosions of fire damp and aid in the purification of the air.

RAILWAY SERVICE.

Employees of the railway service, owing to a life full of hardships, exposures, and responsibilities, together with irregular habits, suffer not only from accidents, but also experience more or less sickness, especially from rheumatic affections, diseases of the digestive and respiratory organs, and injuries and disturbances of the nervous system. Forty-eight per cent of the German railway employees in 1885 were taken sick, as follows: Rheumatism, 8.18 per cent; digestive diseases, 11.12 per cent; respiratory diseases, 8.53 per cent; nervous diseases, 2.73 per cent. The train hands suffered most, and the office employees, of course, the least. The percentage of the different classes of sick employees was as follows:

Per cent of German railway employees taken sick, 1885 and 1886, by occupations.

Occupation.	1885.	1886.
Train arrangers	89	89
Train hands, engineers, conductors, brakemen, etc	66	66
Gate keepers, etc	54	54
Switch tenders	50	53
Track watchmen	40	42
Station employees	33	26
Office employees	23	24

Hedinger[a] has called attention to the fact that only 8 per cent of the German locomotive engineers have normal hearing, while 67 per cent of the engineers and 30 per cent of the firemen have very defective hearing; 14.5 per cent of the track walkers also had defective hearing. The percentage in all increased with the length of the service. The most common affections were catarrh of the internal and middle ear, which were probably due to abrupt changes in temperature.

RAILWAY ACCIDENTS.

The reports[b] of the Interstate Commerce Commission indicate a constant increase in the number of injuries from railway accidents. The number of employees killed by accidents arising from the move-

[a] Zeitschft. des Vereins. d. Eisenbahnverwaltungen, 27, p. 25.

[b] Text of the Nineteenth Annual Report on the Statistics of Railways in the United States for the year ending June 30, 1906.

ment of trains, locomotives, or cars, as distinct from those of other causes, in 1906, was 3,709, of whom 2,310 were trainmen, and 42,962 injured, of whom 34,989 were trainmen. The number of fatalities to trainmen in this class of accidents is nearly equally distributed among collisions, falling from trains, locomotives, or cars, and being struck by trains, locomotives, or cars. When all classes of employees are taken into account the last-named cause is responsible for the greatest number of fatalities.

"Of the fatalities to passengers, collisions account for more than any other single cause, although the number due to jumping on or off trains, locomotives, or cars is nearly as great. In the matter of injuries, however, collisions are far ahead, being responsible for more than 35 per cent of the total injuries to passengers. Taking both passengers and employees into account, it is seen that collisions are responsible for a much higher number of deaths and injuries than any other one class of accidents."[a]

Railway accidents for the years 1888 to 1906.

[From the Nineteenth Annual Report of the Interstate Commerce Commission on the Statistics of Railways in the United States, p. 109.]

Year ending June 30—	Employees.		Passengers.		Other persons.		Total.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
1888	2,070	20,148	315	2,138	2,897	3,602	5,282	25,888
1889	1,972	20,028	310	2,146	3,541	4,135	5,823	26,309
1890	2,451	22,896	286	2,425	3,598	4,206	6,335	29,027
1891	2,660	26,140	293	2,972	4,076	4,769	7,029	33,881
1892	2,554	28,267	376	3,227	4,217	5,168	7,147	36,662
1893	2,727	31,729	299	3,229	4,820	5,435	7,846	40,393
1894	1,823	23,422	324	3,034	4,300	5,433	6,447	31,889
1895	1,811	25,696	170	2,875	4,155	5,677	6,136	33,748
1896	1,861	29,096	181	2,878	4,406	5,845	6,448	38,057
1897	1,693	27,667	222	2,795	4,522	6,269	6,437	36,731
1898	1,958	31,761	221	2,945	4,680	6,176	6,859	40,882
1899	2,210	34,923	289	3,442	4,674	6,255	7,123	44,620
1900	2,550	39,648	249	4,128	5,066	6,549	7,865	50,320
1901	2,675	41,142	282	4,988	5,498	7,209	8,455	53,339
1902	2,969	50,524	345	6,683	5,274	7,455	8,588	64,662
1903	3,606	60,481	356	8,231	5,879	7,841	9,840	76,553
1904	3,632	67,067	441	9,111	5,973	7,977	10,046	84,155
1905	3,361	66,833	537	10,457	5,805	8,718	9,703	86,008
1906	3,929	76,701	359	10,764	6,330	10,241	10,618	97,706

In 1899 the English Government appointed a commission composed of members of the House of Lords and Commons, representatives of the railway companies, railway employees, experts, and government officials, with a view of determining whether the accidents to railway employees were so numerous as to constitute it a dangerous trade. The following table indicates that the employment of shunters (switchmen) is far more dangerous than any other occupation save seamen, and that the average work on railways is almost as dangerous as mining, and also illustrates the relative frequency of accidents in other occupations.[b]

[a] Nineteenth Annual Report of the Interstate Commerce Commission on the Statistics of Railways in the United States, p. 112.

[b] Dangerous Trades, Oliver, pp. 199, 200.

Number of employees killed and injured from all causes per 1,000 employed in various occupations.

Industry.	Killed.	Injured.
Railway servants in general, excluding contractors' men, clerks, and mechanics	1.24	31.0
Goods guards and brakemen	2.92	61.0
Permanent-way men or plate layers	1.9	16.0
Shunters	5.08	78.0
Men porters (railway)	1.16	46.0
Seamen (merchant service)	5.2	(a)
Coal miners:		
Underground	1.37	(a)
Surface	.92	(a)
Metalliferous mines:		
Underground	1.34	(a)
Surface	.43	(a)
Factories:		
Textile—		
Males	.1	6.2
Females		2.7
Nontextile—		
Males	.2	12.8
Females		2.0
Extraction of metals (males)	1.1	16.4
Shipbuilding (males)	.5	20.5
Dock laborers	1.4	57.0

a Unknown.

ACCIDENTS AND INJURIES.

The total number of deaths reported during the census year of 1900 was 57,513, of which 43,414 were males and 14,099 were females, and the proportion of deaths from these causes in 1,000 deaths from all known causes was 57.6. In 1890 the corresponding proportion was 53.7. In the registration area the rate was 96 per 100,000 of population. In 1890 the death rate was 91.9. The rate in the cities was somewhat higher than in rural districts, and the rate for males was about three times as high (125.4) as it was among females (42.2). This is simply due to the more sheltered position of females and because males alone are generally engaged in the more dangerous operations.

The following table shows for the registration area and its subdivisions the—

Death rate from accidents and injuries during the census year in each of three age groups per 100,000 of population.

Registration area.	Under 15.	15 to 44.	45 and over.
Total	67.0	89.8	180.5
Males	86.4	148.7	223.8
Females	48.6	31.1	78.0
Cities	70.2	94.3	168.8
Males	89.5	154.6	220.7
Females	50.9	33.3	80.1
States	63.7	73.4	131.2
Males	80.6	122.3	167.8
Females	46.7	24.9	76.8
Cities	68.2	73.1	139.7
Males	86.1	122.4	206.7
Females	50.3	25.9	77.9
Rural	57.2	78.9	122.6
Males	72.7	122.1	169.5
Females	41.3	28.1	73.5

From this table we learn that the highest death rate from accidents occurred in persons 45 years and over, and the lowest in children under the age of 15, which indicates that employment in factories, mines, and workshops influences to a great extent the number of accidents and injuries. The rates for females are the lowest in all three age groups, for reasons already assigned. Woman occupies a more favorable position even in childhood, on account of the more reckless disposition of boys, whose rates are probably increased by deaths from drowning, falls, burns, gunshot wounds, railroad accidents, etc.

An attempt to determine the number of persons injured to 1,000 employed in the factories was made in the State of New York during 1899. The data are based upon three months' observations in a selected list of factories, and are not regarded by the commissioner of labor and chief factory inspector of the State as absolutely accurate.

Number of persons injured to 1,000 employed.

Industry.	Number.
Clothing, millinery, laundry, etc.	1.35
Leather, rubber, pearl, etc.	3.21
Textiles	8.91
Printing and allied trades	9.19
Food, tobacco, and liquors	13.51
Stone and clay products	15.18
Wood	18.42
Building industry	26.20
Metals, machinery, and apparatus	26.57
Public utilities	37.28
Pulp, paper, and cardboard	41.46
Chemicals, oils, and explosives	44.06

CHAPTER XI.

EMPLOYMENT OF WOMEN AND CHILDREN.

In the face of the many adverse circumstances under which labor is often performed, it is but natural that the immature employees and females should suffer most. The former not infrequently inherit a weak constitution or acquire it by insanitary homes and deficient food, and quite a number are obliged to enter upon active work long before their bodies are sufficiently developed. Quite apart from the fact that child labor is a menace to education, morals, and good citizenship, the effects of premature and involuntary labor upon the health and physical welfare of the child are extremely detrimental. Quetelet, in his Physique Sociale, as early as 1869 demonstrated that the muscles of the average child attain only at the age of 13 or 14 a certain amount of strength and capacity for work. Up to this time the muscular fibers contain a larger percentage of water, and in consequence are very tender and immature. Demetjeff, cited by Rubner,* determined the lifting power of the arms and trunk at different ages of the working classes to be as follows:

* Lehrbuch d. Hygiene, Leipzig und Wien, 1903, p. 709.

Lifting power of the arms and trunk of the working classes at different ages.

Age.	Kilograms.	Age.	Kilograms.
14 years	82	30 to 35 years	150
16 years	101	35 to 40 years	160
18 years	128	40 to 50 years	148
20 to 29 years	140	50 to 60 years	134

These figures clearly indicate that the average boy at the age of 14 possesses about one-half the muscular strength of an average adult between 35 and 40 years of age.

As a consequence of imperfect muscular development, it is not surprising that a large percentage of young persons engaged in workshops, factories, or even at the writing desk or merchant's counter, develop lateral curvature of the spine and other muscular deformities, not to mention general weakness and predisposition to rickets, tuberculosis, and other pulmonary diseases. All of the bad effects are naturally intensified by insanitary environment, especially when the occupations are attended by the inhalation of dust, injurious gases, and impure air. The report of the commission on child labor, 1833-34, appointed by the English Parliament, contains many interesting facts; but in spite of legislative efforts Dr. Charles W. Roberts [a] has occasion to refer to the prevalence of "flat feet," "knock-knee," and the premature aged condition of youthful employees.

Doctor Roberts says:

> In general conformation of body the factory children do not compare favorably with the agricultural. In the manufacturing towns the children are short of stature, have thick limbs, and large feet and hands, and are muscular and in tolerable condition as to fat. They produce the impression on the mind of having bodies too old for their heads (and ages). "Flat foot," with a general disposition to "knockknee," is very common among the factory children, while both are rare among the agricultural, among whom there is a disposition to the opposite state, of bowleg.

Doctor Roberts [b] examined 19,840 English boys and men. Of these, 5,915 belonged to the nonlaboring classes—school boys, naval and military cadets, medical and university students; 13,931 belonged to the artisan class. The difference in height, weight, and chest measurement from 13 to 16 years of age was as follows:

Difference in height, weight, and chest measurement of 19,846 English boys and men at specified ages.

AVERAGE HEIGHT.

Class.	At 13 years.	At 14 years.	At 15 years.	At 16 years.
	Inches.	*Inches.*	*Inches.*	*Inches.*
Nonlaboring	58 79	61.11	63 47	66 40
Artisan	55. 98	57. 76	60. 58	62 98
Difference	2.66	3.35	2.89	3.47

[a] London Lancet, 1875, p. 274.

[b] Cited by John Spargo, Bitter Cry of the Children, 1906, p. 96.

Difference in height, weight, and chest measurement of 19,846 English boys and men at specified ages—Continued.

AVERAGE WEIGHT.

Class.	At 13 years.	At 14 years.	At 15 years.	At 16 years.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
Nonlaboring	88.60	99.21	110.42	123.34
Artisan	78.27	84.61	96.79	103.07
Difference	10.33	14.60	13.63	19.64

AVERAGE CHEST GIRTH.

	Inches.	*Inches.*	*Inches.*	*Inches.*
Nonlaboring	28.41	26.28	30.72	33.08
Artisan	25.24	26.28	27.51	28.97
Difference	3.17	3.37	3.21	4.11

Congress, on February 19, 1907, authorized a federal investigation of the subject of child labor under the direction of the United States Bureau of Labor, and the results of such investigation may more clearly define the need for federal legislation or indicate other means adapted to regulate the evil.

During the census year of 1900 there were 1,752,187 children under 16 years of age employed in gainful occupations; of these over 80,000 were employed in the textile industry; 7,116 in the glass industry; about 25,000 in mines and quarries; 12,000 in the manufacture of tobacco and cigars; over 10,000 in wood industries; over 7,000, mostly girls, were employed in laundries; 2,000 in bakeries; 138,000 as waiters and servants; 42,000 boys as messengers; and 20,000 boys and girls in stores. Mr. John Spargo, in "The Bitter Cry of the Children," on page 211, gives the result of his investigation covering 213 cases of child labor with a view of determining the cause. He found that 52 children were obliged to work because their father earned less than $10 a week; in 13 instances the father was out of employment; in 19 the father was sick; in 12 the father had died; in 4 the father had deserted the family; in 4 other instances he was intemperate, and in 1 case the father was in prison. He concludes that in these 105 instances the primary cause was poverty.

Of 108 other children, the causes are given as follows: School difficulties, 30; "because friends went to work," 18; "to get better clothes," 11; "to enable parents to save," 17; sickness while in school, 5; father's laziness, 2; not determined, 25.

Child labor differs in degree as well as in kind. The ordinary messenger or newsboy may not sacrifice his health, but his morals and his education must inevitably suffer. And so we see different gradations until some of the most injurious forms of child labor are encountered.

Dr. Annie S. Daniel, in speaking of her personal observations in New York, tells us that a child 3 years old can straighten out the leaves of tobacco and can stick together the materials which form the stems of artificial flowers; at 4 he can put the cover on paper

* Charities, April 1, 1905.

boxes; between 4 and 6 he can sew on buttons and pull basting threads. A girl from 8 to 12 can finish trousers as well as her mother. After she is 12, if of good size, she can earn more money in a factory, because she will be accepted if her size justifies the evasion of the law. The boys practically perform the same labor as the girls, except that they leave home earlier and engage in street work as peddlers, newsboys, or bootblacks. Doctor Daniel has actually seen two children under 3 years of age working in the tenements of New York—one, a boy 2½ years of age, assisting the mother, and four other children under the age of 12, in making artificial flowers. "These children earn from 50 cents to $1.50 a week, obviously at the expense of health and education—rights which neither the parents nor the community nor the State have a right to withhold."

A feeling seems to exist in Washington that there is no special need for the enactment of a law to prevent or regulate child labor, but the same class of people told us years ago, that we had no slums, and hence there was no occasion for the betterment of the housing conditions, when, as a matter of fact, investigations have shown conclusively that in many respects we are as badly, if not worse, off than the cities of New York and Chicago. Those who are familiar with the subject know that there is a local situation which demands legislation. But whether the number is large or small it matters little, and it is clearly the duty of every community to resort to preventive measures against this hydra-headed evil.

It has been asked, What is the use of enacting child-labor laws when such atrocious instances are possible in the city of New York, where child-labor law exists? And it must be granted that just such evils will be witnessed in New York or any other American city so long as public opinion and the conscience of the American people is not sufficiently aroused to demand the enforcement of the law.

It has been estimated that there are in this city between 1,500 and 2,000 children under the age of 15 engaged in wage-earning occupations. And we feel that the enactment of a suitable law would guard these children and afford them a better opportunity of becoming useful citizens, and the consumers would at least have the satisfaction of knowing that they are not stained with the sweat and blood of helpless children.

How many more of the 6,000 children between the ages of 8 and 12 who are not now at school are engaged in wage-earning occupations we do not know. But whether they are at work because of the necessities of their parents or because of their own disinclination to study, the law should intervene and establish an effective remedy.

It has been urged, and no doubt in many instances quite correctly, that child labor is encouraged by the greed of the employers, but the writer is in a position to know that the business men of this city would hail with delight the enactment of a child-labor law. As it is now, it is not always an easy matter to refuse to lend a halping hand in apparently deserving and pathetic cases.

It is, indeed, deplorable that so little has been accomplished in the way of educating the public to a sound and full appreciation of the evil consequences of child labor, and it is especially humiliating to know that the District of Columbia, the seat of the National Government, is the only community with the exception of Georgia, Idaho,

Nevada, and the Indian Territory, which is at present without legislation of some kind on the subject of child labor.

Women, on account of their imperfectly developed muscular system and more delicate physique, are unfitted for hard work; nor should they be obliged to work steadily in a sedentary position, especially at the sewing machine or other occupations involving the use of the lower extremities. Special protection should be extended to them during the child-bearing period. It is a matter of constant observation that women who have to deny themselves proper rest and care during the six weeks before and after confinement are very liable to suffer from hemorrhages and chronic uterine diseases, while miscarriages and premature births are not infrequent results of overwork. Recent statistics collected by Doctor Neisser (1907) indicate that such accidents are quite frequent among farmers' wives and women employed in the jewelry industry, where the motor power is supplied by the feet.

INFANT MORTALITY IN RELATION TO THE OCCUPATION OF WOMEN.

Attention has been directed on another page to the high rate of infant mortality in certain mill towns of Massachusetts. This subject has received careful attention, especially in England. The investigations made by Sir John Simon and his colleagues into the sanitary condition of England between 1859 and 1865 showed "that in proportion as adult women were taking part in factory labor or in agriculture the mortality of their infants rapidly increased." Among other causes, Simon attributes the excessive mortality of infants under 1 year, which in some registration districts was from two and a quarter to nearly three times as high as in standard districts, "to occupational differences among inhabitants, there being certain large towns where women are greatly engaged in branches of industry away from home, where, consequently, these houses are ill kept, where the children are little looked after, and where infants who should be at the breast are improperly fed or starved, or have their cries of hunger and distress quieted by those various fatal opiates which are in such request at the centers of our manufacturing industry."[a]

Fifty years have elapsed since Simon declared "infants perish under the neglect and mismanagement which their mothers' occupation implies." The subject has since been studied by the medical officers of the home office, the local government board, and 1,800 local health boards in England. Doctor Newman has carefully surveyed the facts concerning the number of females employed in gainful occupations, the percentage of married women, the infant mortality rate in towns having a low percentage of women so employed, as compared with textile towns, where the percentage of female employees is high. He has given careful consideration to the character and condition of the work, the length of working hours, employment before and after childbirth, and the sanitation of workshops. He dwells very justly upon the evil effects of the added strains of factory life, such as piecework, hard physical labor, injurious trade processes, fatigue, etc.

Doctor Newman tells how in some trades, like brickmaking, tinplate works, iron hollow ware, certain hardware trades, jam and sauce

[a] Papers Relating to the Sanitary State of the People of England, 1858.

factories, and mat work, women are not infrequently employed in carrying or lifting weights altogether beyond their physical endurance. He emphasizes the various dangers to which the female employees are exposed, and summarizes the direct injuries as follows: (*a*) Accidents from machinery, materials, and other external agents; (*b*) injury or poisoning from toxic substances, or injury from excessive dust, fumes, vapor, or extremes of temperature (he refers also to anthrax infections in horsehair factories, tetanus in jute works, lung diseases in dusty trades, and abortion in lead works); (*c*) injury through fatigue and strain, long hours, insufficient periods of rest for food; (*d*) injury derived from defective sanitary conditions, such as bad ventilation, dampness, insufficiency or unsuitability of sanitary conveniences; and (*e*) too short a period of rest at the time of childbirth.[a]

He declares that the official reports of factory inspectors and of medical officers of health reveal ample evidences of these injuries, and adds: "Where the conditions resulting in these evils, coupled with the absence of the mother from home, are present, the infant mortality is high; where they are not present it is usually low." He describes the general effects of the factory system at Dundee, where 24,879 women and girls are employed in the jute and hemp factories, and another 3,000 women are employed in other textile works. One quarter of the women, or about 6,000, are married, and about 16 per cent of all the girls in Dundee between the ages of 10 and 14 are employed in these trades.

The infant mortality rate for Dundee "is exceptionally high, and for the decennial 1893–1902 was 176 per 1,000 births." In 1904 there were 788 infant deaths, 129 of which occurred within the first week, and all but four of these were medically certified as due to "prematurity and immaturity." Nearly one-half of the total number occurred in the first three months of life. Inquiry was made into the social conditions of the home life of 364 of these infant deaths. "The occupations, or former occupations, of the mothers were as follows: Eighty-four weavers, warpers, or winders; 105 spinners, piecers, or shifters; 88 preparers; 12 sack machinists or sack sewers; 27 miscellaneous; 20 unoccupied, and 25 concerning which there was no return obtainable. Of the cases inquired into 13.2 per cent of these mothers worked at the factory to within a week of childbirth. Fifteen women worked to within a few hours of childbirth."

Doctor Newman's final conclusion on the subject of infant mortality in relation to the occupation of women is as follows:[b]

> No doubt the factory plays a part, but the home plays a vastly greater part, in the causation of infant mortality in the towns where women are employed at the mills. There are two influences at work—first, the direct injury to the physique and character of the individual caused by much of the factory employment of women, and, secondly, the indirect and reflex injury to the home and social life of the worker. We can not afford to forget either of these points in attempting to estimate the operations of the factory in infant mortality. It is because they have not been sufficiently correlated together that fallacy has arisen in the past. But even yet we have not finished. "Infantile mortality in Lancashire," writes an experienced medical officer of health for a town in that county with an infant mortality in 1904 of 222, "is, I am sorry to say, as much a financial as a hygienic question." Why do married women work in the mills? is the question this medical officer has reached. His answer is that "a

[a] Infant Mortality, George Newman, M. D., New York, 1907.
[b] Infant Mortality, Newman, p. 137.

weaver's wages will not allow of the wife's remaining at home, considering the high rents and rates, and so both go—which is the rule—and a hand-to-mouth existence results even for themselves, let alone the little ones, who are left in the intervals to the mercies of the nurse, who, as a rule, takes in the babies to eke out her own husband's wages. Much good may be done by hygienic tuition, but I am certain that the root of the whole matter with us is, as I have said, comparatively low wages and high rents and rates.

In the discussion of infant mortality it would be unfair not to emphasize other facts, such as impure and dirty milk and 1-room tenements. Of 54,047 infantile deaths which were investigated both in the Old and the New World as to the character of feeding, it was found that 86 per cent had been artificially fed. Neumann,[a] in investigating 2,711 infantile deaths in Berlin, found that 1,792 occurred in 1-room apartments, 754 in 2-room apartments, 122 in 3-room apartments, and 43 in apartments of 4 rooms and over.

It is hoped that Doctor Newman's study of the subject will result everywhere in the amelioration of existing conditions, for, as pointed out by the author and Sir John Simon, a high death rate of infants suggests racial degeneracy and is at least "an indication of the existence of evil conditions in the homes of the people—which are, after all, the vitals of the nation."

Doctor Daniels, in speaking of the female labor question in New York, says:

That in no case in over 515 families examined by her was any woman working other than from dire necessity. The average weekly income from the man's work was $8.81. The average rent was $9 per month. The average family to be supported was 4½ persons. As it requires more than two weeks' wages to pay one month's rent, it is evident that the women and children must work or the family go hungry. (Charities, April 1, 1905.)

Those interested in female labor as carried on in the "sweat shops" of New York at the rate of $3 to $4 a week should not fail to read "The Long Day: The True Story of a New York Working Girl as Told by Herself."

CHAPTER XII.

SPECIAL MEASURES FOR THE PREVENTION OF TUBERCULOSIS AMONG WAGE-EARNERS.

There is abundant statistical evidence to show that industrial workers pay a very heavy tribute to the so-called "white plague;" nor is it cause of wonder when the many unfavorable factors to which they are subjected are considered, such as crowded and insanitary workshops, deficient light, overwork, long hours in a bad air, dampness, exposure to extremes of heat and cold, sudden changes in temperature, and the inhalation of irritating dust, vapors, etc. All of these factors are calculated to lower the power of resistance and favor the spread of disease, especially when some of the workmen themselves are already afflicted and are careless in the disposition of their expectoration.

On the other hand, it would be unfair not to consider the influence of home environment, such as unclean and crowded or otherwise insanitary dwellings, insufficient or improper food, and last, but not

[a] Deutsche med. Wochenschrift, Leipzig, 1904, p. 1723.

least, the bad effects of the abuse of alcohol. It has been shown that alcohol not only affects the digestive and nervous functions, in consequence of which the general nutrition of the body is markedly reduced, but the habit of visiting and remaining in saloons for hours, sometimes till midnight, deprives the individual of proper rest and exposes him to the poisonous fumes of tobacco, coal and carbonic-acid gases, and other injurious agents. The preventive measures are partly the duty of the State, which should regulate the air space and ventilation of the workshops and dwellings and improve the working conditions by forced ventilation and "wet processes" in order to diminish dust production and exposure to irritating gases. On the other hand, it is clearly the duty of the workmen themselves and the community at large to improve social and housing conditions. In view of the undue prevalence of consumption among file cutters, metal grinders, stone cutters, and cotton, flax, and tobacco operatives, persons predisposed to this disease should be cautioned against engaging in such occupations. Simple printed instructions should be given as to the part expectoration plays in the spread of consumption. Cuspidors in sufficient number and properly disinfected should be provided, preferably one for each workman, and promiscuous expectoration should be forbidden.

CHAPTER XIII.

MEASURES FOR THE PROTECTION OF WAGE-EARNERS.

From what has been said it is evident that the laboring classes need special protection against the many dangers referred to, and this should emanate from the State, the employers, the community, and the employees themselves.

One of the important predisposing causes to disease is overwork or fatigue, because the accumulation of waste products in the blood, from muscular wear and tear, together with the expended nervous energy, combine to render the system more susceptible to disease. Excessive work is inimical to health, and long hours and hard work are calculated to diminish the general power of resistance, and thus bring about physical deterioration. Hence the necessity of laws regulating the hours of labor and the enforcement of a day of rest as contemplated by the Sunday laws.

Professor Roth's conclusions on this subject are as follows:[a] (1) In order to prevent a state of chronic fatigue it is essential that the amount of work be regulated by the capacity of the individual; (2) the more intensive the work and the shorter the intervals of rest for the elimination of waste products the earlier we may expect manifestations of fatigue, and the working hours must be regulated accordingly; (3) other industrial dangers, like excessive heat, humidity, violent concussions, constrained attitude, overexercise of certain groups of muscle, exposure to vitiated air and toxic agents favor premature fatigue, and should be controlled by rational measures;

[a] Ermuedung durch Berufsarbeit Intern. Kongress fuer Hygiene und Demographie, Berlin, 1907, Band, II, p. 620.

(4) insufficient and improper food, vicious habits, long walks to place of work, and abuse of alcoholic drinks lower the vital powers and produce premature fatigue; (5) monotonous work or any employment involving responsibility and intense mental application are conducive to fatigue. All of these factors should be considered and controlled by suitable preventive measures, so as to avoid the chronic effects of fatigue, which are generally evinced by anæmia, digestive derangements, neurasthenia, respiratory and cardiac difficulties.

No child should be permitted to work in factories and wage-earning occupations under the age of 14, and then only upon presentation of a medical certificate that it is free from physical defects. Such children should not be obliged to work longer than six hours, with a two-hour interval of rest after the first three hours, so that they may be able to enjoy their noon dinner. Under no circumstances should they be permitted to perform night work or engage in the so-called dangerous occupations. The same may be said of individuals between the age of 16 and 18 years, who, however, may be permitted to work eight hours a day, with proper intervals for meals and rest.

Women, even from a moral standpoint, should not be permitted to work in factories or shops after sundown. The laws of some countries prescribe one hour for nooning, if they have their own households, and their exclusion from factories six weeks before and after confinement, while in other countries hard labor for women is strictly forbidden.

SANITATION OF WORKSHOPS AND QUARTERS FOR EMPLOYEES.

The protection of wage-earners should extend to the work and workshops, and, in case the employees are housed by the employer, also to the living and sleeping quarters.

A sanitary workshop demands sufficient air space for each inmate, a suitable temperature, proper ventilation and illumination, general cleanliness, and suitable opportunities for personal cleanliness. The necessity for abundant ventilation is apparent when it is recalled that men at work eliminate more carbonic-acid gas than individuals at rest, and that in the majority of occupations the air is further vitiated by the presence of dust and gases.

The question of illumination is not only important for the prevention of defective vision and accidents, but when recourse is had to artificial illumination the additional vitiation of the air must be considered. Such matters, which, after all, are largely questions of public health, should not be left to the individual employer, but the principles of industrial hygiene which ought to be adopted should be embodied in suitable laws and enforced by competent inspectors. Among the most dangerous forms of workshops is one class which most state laws entirely ignore. For example, under the law of the State of New York relating to manufacturing in tenement houses, 33 distinct industries may be carried on in the living rooms of the workers, because they involve hand work or simple machinery. There are over 23,000 licensed "home factories" in the city of New York alone. Dr. Annie S. Daniels, who made a special investigation of manufacturing in tenements, says[a] "that every garment worn by a

[a] Charities, April 1, 1905.

woman is found being manufactured in tenement rooms; the same is true of clothing worn by infants and young children. In addition to wearing apparel for men, women, and children, including adornments of woman's dress, the flowers and feathers for her hats, the hats themselves, and neckwear of every description, she found the manufacture of paper boxes, cigars, pocketbooks, jewelry, clocks, watches, wigs, fur garments, paper bags, etc., and the articles frequently handled and stored in infected rooms." According to Doctor Daniels, among the 150 families tabulated by her, 66 continued at work during the entire course of the contagious disease for which she was attending the family, and the question naturally arises, How many germs of tuberculosis, measles, scarlet fever, diphtheria, and other infectious diseases may be sewed in the garments made in the tenement "sweat shops?" "And last, but not least, the greatest danger falls upon the workers—it means the loss of health, physically and morally, the loss of home, because home life is impossible in a tenement workroom."

Apart from the occupations referred to, numerous bakeries, candy, ice-cream, and milk shops; butcher shops and sausage factories; bottling establishments; tailor, cobbler, and other repair shops are carried on in basements under the most insanitary surroundings as regards workrooms and sleeping quarters.

CUBIC AIR SPACE AND AMOUNT OF FRESH AIR PER HOUR.

Reference has been made to the baneful effects of vitiated air, which are of course intensified when the occupation is attended with the production of dust and irritating fumes or gases. It is known that carbonic acid is not itself a toxic agent, but an excess of this gas in the air of rooms leads to a deficiency of oxygen and also to defective elimination of carbonic acid from the system, which can not be excreted whenever the tension of carbonic acid in the air exceeds that of the carbonic acid in the blood. In order that the respiratory impurities may not exceed certain limits (6 volumes of carbonic acid per 10,000), it has been found that an average adult requires 3,000 cubic feet of fresh air per hour, and this amount should be supplied without discomfort to the occupants. Experience has shown that the air of a room can not be changed oftener than three times in one hour in winter without causing a disagreeable draft; hence every occupant should have a cubic air space of 1,000 feet. This is the ideal standard, and section 100 of the factory laws of New York of 1901 (as amended by chapter 129, acts of 1906), relating to certain manufactures in tenements, provides "that the whole number of persons therein shall not exceed one to each 1,000 cubic feet of air space." Such an ideal standard, however, is not always attainable in workshops, and it is believed that for practical purposes an air space of from 400 to 500 cubic feet per capita will suffice.

The States of New York, Indiana, Michigan, New Jersey, Ohio, Pennsylvania, and Wisconsin appear to be the only States which make a definite provision on this point, and they require an air space of 250 cubic feet for each employee between the hours of 6 a. m. and 6 p. m., and, unless by written consent of the factory inspector, not less than 400 cubic feet for each employee between the hours of 6 p. m. and 6 a. m., provided such room is lighted by electricity, etc. This is a step in the right direction, but it would be extremely desirable to

place the minimum amount of cubic air space at 400 feet for day work and 500 feet for night work, unless electricity is used, in which case a uniform standard of 400 feet might be prescribed. At all events the question of sufficiency ought not to be left to the discretion of the factory inspector. Either the cubic air space should be specified or the carbonic acid limited to 12 volumes per 10,000.

VENTILATION.

Ventilation, which means the removal and dispersion of bad air and the introduction of fresh air, is accomplished either by natural or artificial means. Natural ventilation is usually sufficient when each occupant has 1,000 feet of cubic air space, the walls of the building are porous or contain numerous crevices near the doors and windows, the difference betwen the indoor and outdoor temperature is considerable, and the winds strike the walls directly or pass with great velocity over chimney flues or other openings. But as the direction and force of the winds and the other factors referred to can not be controlled, other means should be provided for ventilation. For this purpose, open windows, doors, and revolving fans answer very well in summer. The objection to this method are the cold drafts in winter. In rooms heated with direct radiation the fresh air should therefore be admitted above the heads of the occupants, either by fresh-air register inlets in the walls or by the insertion of louvered or swinging windows, thus an upward direction being given to the air, so that it may impinge on the ceiling, mix with and be warmed by the heated air in this situation, falling gently into all parts of the room, and being gradually removed by means of the foul-air outlets, aided by exhaust fans. Another simple plan is to bore slanting holes in the bottom rail of the window sash, or to employ a Pullman or Bury ventilator, or to insert a piece of board 4 inches wide across the window sill. The separation of the sashes thus caused will provide for indirect fresh-air inlets.

Artificial ventilation, which may be secured by providing (1) suitable inlets and outlets; (2) by extraction by heat, or the creation of a decided difference between the inner and outer temperature; and, (3) by propulsion and aspiration. Space will not permit to enter into details except to say that besides the contrivances already mentioned, any of the ordinary registers in which the air passes through the walls by means of a perforated iron plate and is then directed upward by a valved plate with side checks will prove of service. McKinnel's ventilator consists of two cylinders, one inside the other and of different lengths, the longer tube, projecting above and below, serves to conduct the impure air, while the outer cylinder, having a larger sectional area, serves as an inlet. The outlet is protected on the top with a cowl, and both tubes can be regulated by valves. They are especially useful in the ventilation of one-story buildings or the upper story of any building. If gas is used as an illuminant, the burners may be placed immediately under the extracting tube. As the warm air escapes through the inner tube a corresponding volume is admitted through the interspace between the two cylinders.

The Ridge ventilators consist of openings through the ceiling and roof with louvered sides and ends, protected with a small roof, the opening of the air shaft in the ceiling usually being provided with

suitable registers. The fresh air is admitted by the means already referred to, or by registers placed behind radiators. If the building is heated by stoves, the fresh air may be admitted by inlets running underneath the floor between the joists and discharging through a register near the stove.

Extraction of foul air by heat is usually accomplished by placing a separate flue next to the chimney flue; the latter, if in use for firing purposes, creates an upward current. If this is not sufficient it may be promoted by gas jets or a steam coil placed in the flue.

The propulsion and aspiration system is especially adapted for all large buildings and factories, and consists of mechanical devices by which the fresh air is forced into and distributed throughout the building by the use of fans or air propellers, the foul or objectionable air being removed by so-called exhaust fans. A number of States have made statutory provisions for the ventilation of workshops, and quite a number, including California, Connecticut, Illinois, Indiana, Iowa, Maryland, Massachusetts, Ohio, Oregon, Pennsylvania, Michigan, Minnesota, Mississippi, New Jersey, New York, South Dakota, Washington, and Wisconsin, require mechanical devices for the removal of injurious dust or gases. Of these States several lay down specific rules concerning the construction of workbenches and hoods. The latter empty into air shafts connected with exhaust fans, and thus extract all dust and fumes without material injury from drafts to the operatives. The provisions apply especially to operations in which emery wheels or belts or other buffing processes are employed. The laws of the State of Michigan, acts of 1899, furnish a good example of regulations of this character.

ACT NO. 202.—Factories and workshops—Blowers for emery wheels, etc.

SECTION 1. All persons, companies or corporations, operating any factory or workshop, where wheels or emery belts of any description are in general use, either leather, leather covered, felt, canvas paper, cotton or wheels or belts rolled or coated with emery or corundum, or cotton, wheels used as buffs, shall provide the same with fans or blowers, or similar apparatus, when ordered by the commissioner of labor, which shall be placed in such a position or manner as to protest [protect] the person or persons using the same from the particles of the dust produced and caused thereby, and to carry away the dust arising from, or thrown off by such wheels, or belts, while in operation, directly to the outside of the building or to some other receptacle placed so as to receive and confine such dust, and the same shall be placed in such factory or workshop within three months after this act shall take effect, in the manner and according to the directions and specifications as herein, in this act set forth: *Provided*, That grinding machines upon which water is used at the point of grinding contract shall be exempt from the conditions of this act: *And provided further*, That this act shall not apply to solid emery wheels used in sawmills or planing mills or other woodworking establishments.

SEC. 2. It shall be the duty of any person, company, or corporation operating any such factory or workshop to provide or construct such appliances, apparatus, machinery or other things necessary to carry out the purpose of this act, as set forth in the preceding section, as follows: Each and every such wheel shall be fitted with a sheet or cast-iron hood or hopper of such form and so applied to such wheel or wheels that the dust or refuse therefrom will fall from such wheels or will be thrown in such hood or hopper by centrifugal force and be carried off by the current of air into a suction pipe attached to same hood or hopper.

SEC. 3. Each and every such wheel six inches or less in diameter shall be provided with a three-inch suction pipe; wheels six inches to twenty-four inches in diameter with four-inch suction pipe; wheels from twenty-four inches to thirty-six inches in diameter with a five-inch suction pipe; and all

wheels larger in diameter than those stated above shall be provided each with a suction pipe, not less than six inches in diameter. The suction pipe from each wheel, so specified, must be full sized to the main trunk suction pipe, and the said main suction pipe to which smaller pipes are attached shall, in its diameter and capacity, be equal to the combined area of such smaller pipes attached to the same; and the discharge pipe from the exhaust fan, connected with such suction pipe or pipes, shall be as large or larger than the suction pipe.

SEC. 4. It shall be the duty of any person, company or corporation operating any such factory or workshop, to provide the necessary fans or blowers to be connected with such pipe or pipes, as above set forth, which shall be run at such a rate of speed as will produce a velocity of air in such suction or discharge pipes of at least nine thousand feet per minute or an equivalent suction or pressure of air equal to raising a column of water not less than five inches high in a U-shaped tube. All branch pipes must enter the main trunk pipe at an angle of forty-five degrees or less. The main suction, or trunk pipe, shall be below the polishing or buffing wheels and as close to the same as possible and to be either upon the floor or beneath the floor on which the machines are placed to which such wheels are attached. All bends, turns or elbows in such pipes must be made with easy smooth surfaces having a radius in the throat of not less than two diameters of the pipe on which they are connected.

SEC. 5. It shall be the duty of any factory inspector, sheriff, constable or prosecuting attorney of any county in this State, in which any such factory or workshop is situated, upon receiving notice in writing, signed by any person or persons, having knowledge of such facts, that such factory or workshop, is not provided with such appliances as herein provided for, to visit any such factory or workshop and inspect the same and for such purpose they are hereby authorized to enter any factory or workshop in this State during working hours, and upon ascertaining the facts that the proprietors or managers of such factory or workshop have failed to comply with the provisions of this act, to make complaint of the same in writing before a justice of the peace, or police magistrate having jurisdiction, who shall thereupon issue his warrant directed to the owner, manager, or director in such factory or workshop, who shall be thereupon proceeded against for the violation of this act as hereinafter mentioned, and it is made the duty of the prosecuting attorney to prosecute all cases under this act.

TEMPERATURE.

It is a well-known fact that the welfare and capacity for work of individuals are to a great extent influenced by the surrounding temperature. Reference has been made to occupations involving exposure to extremes of heat and cold, dampness, and sudden changes. The human organism possesses the faculty of maintaining a uniform temperature, i. e., it so regulates and harmonizes the production and the loss of animal heat that the normal temperature of the blood, 98.2° F. is not materially affected, and in this the skin doubtless plays the most important rôle. Whenever cold acts upon the skin the irritation is primarily exerted upon the nerves, which transmit it to the central organs of the nervous system (the heat-regulating center), and from there it is reflected to the nerves of the cutaneous vessels and muscular fibers, which promptly contracts, and in consequence of a diminished blood supply there is less loss of heat. If, on the other hand, heat instead of cold plays upon the skin, we have dilatation instead of contraction of the vessels, with an increased surface blood supply and corresponding loss of heat by radiation and conduction. At the same time the perspiratory glands are stimulated to greater activity, more sweat is excreted and evaporated, and still more heat is dissipated. One of the bad effects of profuse perspiration is that the blood is deprived of some of its constituents. The blood is taken away too long from the internal organs; the proper distribution of the blood supply is interfered with, and in consequence

tone and nutrition of the stomach, lungs, heart, and other internal organs is lowered. We lose our appetite and suffer from indigestion; the tone and nutrition of the stomach, lungs, heart, and other internal enervation, and the system in consequence is rendered more susceptible to disease.

While the human organism endeavors to adapt itself to extremes of heat and cold, the faculty of the body to maintain the equilibrium is by no means unlimited, and the heat-regulating center is liable to fail or become paralyzed if imposed upon too long or too frequently. This is especially the case during sudden changes of temperature. It is the abruptness which offends the peripheral nerves, and the greater the abruptness the more intensive will be the irritation which is transmitted by reflex action to other parts of the body, usually the weakest parts, and may result in driving the blood to internal organs, causing congestion and other mischief. Then again a cold draft playing on the cheek may cause neuralgia, paralysis, sore throat, bronchitis, or pneumonia, showing that cold applied locally may excite disease in the neighborhood of its application or in distant organs, and finally it may produce disease by checking the secretions of the skin.

The most agreeable temperature for average healthy adults properly clothed and performing light work is between 65° and 70° F., and every effort should be made to avoid extremes of heat and cold. Much may be done to reduce the temperature of workshops by forced ventilation and a supply of cool, fresh air. The windows should be kept open during the summer nights, so that the rooms may be thoroughly flushed with fresh and cool air.

HUMIDITY OF THE AIR.

The atmosphere always contains a certain amount of water in the state of vapor, which varies from 30 per cent to complete saturation, or, according to temperature, from 1 to 12 grains in a cubic foot of air. The degree of atmospheric humidity is of special hygienic importance, as it influences to a great extent the cutaneous and pulmonary exhalation of vapor and in consequence also affects the animal temperature. The average daily amount of water eliminated by the skin is 2½ pounds, and about 10 ounces by the lungs. It is evident that when the air is damp it lessens evaporation, as it possesses little drying power, and the water from the skin and lungs is with difficulty evaporated. The evaporation of perspiration, by which much heat is rendered latent, is one of the chief sources of cooling of the body. Consequently when the air is hot and moist the humidity tends to increase the effects of the heat, the blood is with difficulty kept at its proper temperature, and all the disagreeable effects of a high temperature are intensified. This condition may be so aggravated that the temperature of the body exceeds the normal degree and causes our cases of so-called heat stroke or heat exhaustion, which occurs especially on hot, sultry days.

A damp, cold, or chilly air also produces mischief, as it abstracts an undue amount of animal heat, lowers the general vitality of the system, and favors the development of diseases of the respiratory passages, neuralgic and rheumatic affections, and aggravates the severity of such attacks. We may conclude, therefore, that excessive

humidity tends to intensify the effects of both heat and cold. On the other hand, excessive dryness of the air is also harmful; it increases evaporation, the skin becomes dry and chapped, and the mucous membranes of the mouth, eyes, and respiratory passages are irritated, causing so-called catarrhal conditions. For all these reasons an average relative humidity between 65 and 75 per cent has been found most healthful, and efforts should be made to maintain such a standard whenever practicable. Apart from methods calculated to accomplish these results, reliable thermometers and hygrometers are required to secure efficient control. State legislators would do well, instead of making a general provision for sufficient heat, moisture, etc., to prescribe a standard, at least in industries where such standards are practicable and can be reasonably enforced.

LIGHTING.

The natural light in workshops should be sufficient so that the eyes need not be strained even on cloudy days. When the light is defective the objects have to be brought too near. The eyes in consequence converge, and the muscular strain thus induced causes a gradual elongation of the anterior-posterior axis of the eyeball, and nearsightedness results. In addition it is believed by specialists that 80 to 90 per cent of the headaches are caused by eye strain. It has been found by Putzeys* that the natural lighting in temperate climates will usually come up to hygienic requirements when the area of windows, exclusive of sash frames, equals one-sixth of the floor space. In order that the light may penetrate the deeper portions of the room, the windows should reach almost to the ceiling and the glass should be either pure white ribbed or prismatic and kept clean. Wisconsin is apparently the only State which has undertaken to legislate specifically upon this point, as section 3 of chapter 79, acts of 1899, provides:

> Every window shall have not less than 12 square feet in superficial area, and the entire area of window surface shall not be less than 12 per cent of the floor space of such room.

The difficulty of securing a sufficient amount of daylight in buildings located on narrow streets surrounded by tall buildings has been partly overcome by glass building blocks 8 by 6 by 2½ inches, with an air chamber in the center, used instead of brick or stone, in connection with steel-frame construction, but more particularly by the introduction of prismatic glass, which refracts and diffuses the light.

ARTIFICIAL LIGHT.

No matter how obtained, artificial light differs from daylight in this, that it does not furnish a pure white light, the prevailing rays being red, yellow, or violet. Whatever difference of opinion there may be as to the color best suited to our eyes, we know that our vision is most perfect under the influence of a white light, and this ought to be a good criterion. One of the disadvantages of all low-power illuminants is that the light is never as bright as daylight, involving, therefore, closer application of the eyes and consequent strain

* Cited by Munson, Military Hygiene, 1901, p. 521.

of the muscles of the eyeball. These remarks are hardly applicable to the electric arc light and the Welsbach gas burner, the rays of which, like the direct solar rays, may indeed be so glaring as to cause undue irritation of the retina.

Another harmful effect of artificial illumination is the unsteady or flickering character, especially seen in the electric arc light, and which on account of the abrupt changes is likely to irritate the retina. Another disadvantage is that the ordinary illuminants, except the electric light, tend to vitiate the air by the products of combustion, and also affect the temperature and humidity of the air by the heat evolved.

The requirements of a hygienic light are that it should be as near as possible the color of the sunlight, sufficiently ample but not too glaring; it should be steady, and instead of deteriorating the air it should as far as practicable be utilized to promote ventilation; nor should the heat evolved be sufficiently intense to be a source of discomfort to the inmates in warm weather. The most common methods of lighting now employed are the electric incandescent lamps, arc lights, mercury-vapor lights and electric bulbs, gaslight, and kerosene lamps. Of these, the electric lights, especially the mercury-vapor lights, are superior to gas or other illuminants because there is little or no danger from fire, there are no products of combustion, hence no pollution of the air, nor are the temperature and humidity of the room affected to any perceptible extent. These advantages over gas or kerosene are of special importance to the inmates of the buildings where the question of fresh air and temperature plays an important rôle; hence many industrial plants find it profitable to install the very best type of electric lighting, and thereby save time and money by the prevention of sickness and accidents among their employees. Next to the electric light, gas, especially in connection with a Welsbach or Siemen's burner, or the acetylene gas, offers the next best choice. In the absence of either electric or gas light, kerosene with a high flashing point should be preferred over other illuminants. In all such instances suitable outlets for the products of combustion should be provided.

White, clean ceilings and walls will be of great service not only in solving the question of light, but also in general sanitation, and a number of States, notably Indiana, Kentucky, Missouri, New Jersey, and New York, require the walls to be limewashed or painted.

The sufficiency of artificial lighting may be approximately determined by observation, and quite accurately by the employment of Bunsen's method and his photometer. In this country and England, according to Munson, "the unit adopted for the measurement and comparison of lights is a No. 6 sperm candle burning 8 grams per hour and giving out a light known as '1 candlepower.'" Such a candle contains on analysis carbon 80 per cent, hydrogen 13 per cent, oxygen 6 per cent, and in combustion yields equal volumes of carbonic acid and watery vapor to the air, namely, 0.41 cubic foot.

PREVENTION OF ACCIDENTS.

About 22 States have taken steps to reduce accidents to a minimum. For this purpose they have enacted laws concerning employers' liability if they fail to provide safety devices for the movable and

dangerous parts of machinery. Apart from proper screening, belting, etc., the use of respirators, wire masks, and goggles are absolutely essential for the prevention of accidents or injuries in many employments. At least 27 States require some form of protection in case of fire, by means of fire escapes and doors swinging outwardly, while a respectable number also insist upon inspection and registration of steam boilers.

A careful inspection of steam boilers and examination of engineers have materially lessened the dangers from boiler explosions, so that in England there is only about 1 explosion in 6,200 registered boilers.

It has been suggested that employees who come in contact with moving machinery should provide themselves with suitable clothing, so fitted and arranged as to reduce the dangers to a minimum. There is an endless variety of suitable patterns in the market, of which the snug-fitting duck union suits properly buttoned and adjusted are the best. Asbestos clothing has been recommended for firemen and furnace operators; but as it is rather heavy, light leather suits or aprons are preferable, while even ordinary clothing may be rendered practically noninflammable by chemical treatment.

The following views of Mr. Frederick Hoffman[a] in his excellent article on industrial accidents are reproduced:

> The present state of American industrial accident statistics does not warrant final conclusions regarding the true rate of the risk in different employments nor of the approximate determination of the occupation hazard, by degree of injury, for the more important industrial employments. Most of the present information is limited to the facts of accidental death or injuries generally, and while such data have their value they require to be made more specific to throw light upon the larger problem of accident prevention and workingmen's compensation for industrial casualties. The importance of such information has been clearly brought out in an address on "Valuation, in Actions for Damages for Negligence, of Human Life, Destroyed or Impaired," by Miles M. Dawson, before the International Actuarial Congress in 1903.[b] For insurance and other purposes, however, the data presented in this article will prove useful and emphasize the more dangerous trades and the present tendency toward an increase or decrease in the risk of accidental injury in the more important dangerous occupations.[c] To the workingman himself there is no more important problem than the most effective protection of his life and health against the accident risk inherent in, or incidental to, the occupation in which he is employed. Much that could be done for his protection is still neglected, though many important and far-reaching improvements have been introduced in factory practice during the last decade. Accurate statistics alone can furnish a reasonable basis for reform. The possibilities for successful accident prevention have been clearly demonstrated in the experience of foreign countries and the exhibition of safety devices of the American Institute for Social Service.

SOCIAL ASPECTS OF THE ACCIDENT PROBLEM.

"The facts presented in this article warrant the conclusion that the casualty risk in American industries is a most serious one, toward the reduction of which every effort should be made. At least a more

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[a] Bulletin of the Bureau of Labor No. 78. Washington, D. C., September, 1908.

[b] Proceedings Fourth International Congress of Actuaries, 1904, Vol. I, p. 929.

[c] A useful and suggestive work on the prevention of accidents in industry has been published by the German Association of Trade Unions entitled: Unfallverhütungsvorschriften, herausgegeben vom Verbande Deutscher Berufsgenossenschaften, Berlin, 1900. Mention may also be made of a valuable treatise on definition of invalidity under the title: Der Begriff der Erwerbsunfähigkeit auf dem Gebiete des Versicherungswesens, by H. Siefart, Berlin, 1906.

earnest effort should be made to profit by the industrial methods of European countries. Granting that the underlying conditions are often quite different, and that many of our industrial accidents are the result of ignorance, reckless indifference, or carelessness, the fact remains that an immense amount of human life is wasted and a vast amount of injury is done to health and strength, with resulting physical impairment, which has a very considerable economic value to the nation as a whole. If, for illustration, the accident liability of employees in coal mines in the United States were reduced from 3.10 per 1,000, which was the average annual rate for the period 1897–1906,[a] to 1.29 per 1,000, the average rate in the United Kingdom for the same period,[b] the annual saving in human life would be 915. If the rate of casualties of railway employees in this country were reduced from 2.50 per 1,000, which was the average annual rate for 1897–1906,[c] to 0.98 per 1,000, the average for the German Empire for the same period,[d] the annual saving would be 1,735 valuable human lives. As stated at the outset, upon a conservative estimate, the total mortality from accidents in the United States among adult male wage-earners is between 30,000 and 35,000, of which it should not be impossible to save at least one-third and perhaps one-half by intelligent and rational methods of factory inspection, legislation, and control. In addition there were approximately not much less than two million nonfatal accidents, that not only involve a vast amount of human suffering and sorrow, but materially curtail the normal longevity among those exposed to the often needless risk of industrial casualties." (Hoffman.)

MISCELLANEOUS SANITARY PROVISIONS.

A number of States have enacted laws concerning general cleanliness of factories and workshops. Most of the factory laws make provisions for the necessary sanitary conveniences, such as privies, water-closets, and urinals, and where men and women are employed separate dressing rooms and water-closets are called for. Some of the States, like Wisconsin, for example, specify "that when the number employed is more than 25 of either sex there shall be provided an additional water-closet for such sex up to the number of 50 persons, and above that number in the same ratio." The author believes that there should be at least one water-closet or privy for every 20 employees.

A large number of States make seats for female employees, wash rooms, and dressing rooms obligatory, and not a few insist upon separate provisions for the sexes. The importance of personal cleanliness has been pointed out. In certain occupations the washing of the hands before eating is important, and in occupations involving exposure to poisonous dust or agents the employment of a general bath should be encouraged by insisting upon the introduction of suitable shower baths.

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[a] Computed from the mine inspectors' reports of the various States.

[b] Computed from statistics included in the annual reports of the Home Office entitled "Mines and Quarries: General Reports and Statistics, London."

[c] Computed from statistics shown in the Report of the Interstate Commerce Commission, Statistics of Railways, 1906, pp. 42, 109.

[d] Computed from Statistisches Jahrbuch für das Deutsche Reich, 1908, pp. 85–88.

A few States, notably Massachusetts and Rhode Island, make provisions for "fresh drinking water of good quality." The former also regulates the spitting habit by insisting upon suitable spittoons. These and other questions, like clothes lockers and lunch rooms, and the time allowed for the noonday meals, which is already regulated in a number of States, should receive universal attention. Much industrial legislation has been enacted by state legislatures during the past ten years. Commendable progress has been made in the provision of ventilation, heating, lighting, removal of dust, and general sanitation of workshops. The need for additional improvement is shown by the Massachusetts board of health's survey of the work in that State, which has generally been in the lead in factory laws.

The report of the state board of health, on page 4, reads:

> In many [industries] the conditions were found to be satisfactory. In the emery and corundum, sandpaper, and certain other industries more attention should be given to keeping the dust away from the mouth and nostrils of the workmen. In the rag dusting, sorting, and cutting rooms of some paper mills very objectionable amounts of dust were found, with some pale and sickly appearing operatives; but there are mills using the same kind of stock where the dust is kept away from the employees in a satisfactory manner, and much improvement is practicable in the former class.

The same remarks are applicable to the textile industries, and the hope is expressed that the unsatisfactory conditions found in the minority of establishments will be raised to those which are now found to be good.

Reference has already been made in these pages to the conditions found in machine shops, the cutlery and tool industry, cigar, rubber, boot and shoe, and other industries examined. In the boot and shoe industry comment is made upon "four conditions which can be and ought to be remedied." These are poor ventilation, inadequate removal of dust from machines, the conditions of water-closets, and spit upon the floors. In the majority of factories visited the ventilation was found to be poor, and in many of them distinctly bad. Of the rooms not especially dusty, 102 were badly ventilated and 26 were overcrowded. * * * Of 84 of the many dusty rooms reported, 40 were also overcrowded, 35 were dark, 21 were overheated, and 18 were overcrowded, dark, and overheated.

"In more than one-third of the factories visited the conditions of water-closets were not commendable; most of them were dark and dirty to very dirty. In 50 establishments no spitting was noticed, in 173 there was some, in 115 considerable, and in 35 much."

"In some establishments lunch rooms are provided, where employees may eat the luncheon they have brought or may buy one; in much the larger number the employees eat in the workrooms. * * * In 85 factories, or 23 per cent of those visited, a considerable proportion of the employees are noticeably pale and unhealthy."

In discussing the following provision in the Massachusetts laws, "All factories shall be kept clean," the state board of health very properly points out that "what is clean in an ax-grinding factory would not be clean in a silk mill; but the law makes no distinction, and the judgment of the officer can not be received as law." The board considers it impossible to specify in any law a standard of cleanliness applicable to all industries, and advises "that the officer should be authorized to hold all factories in any industry up to the

standard of cleanliness which he finds maintained in the factories in the same industry and using the same grade of stock which are the cleanest." The same method is recommended for the enforcement of standards in other directions, subject to an appeal to the state board of health.

LODGING HOUSES AND SLEEPING QUARTERS.

It not infrequently happens that large industrial plants and contractors provide board and lodging for their unmarried employees. Again, in a number of the smaller industries the employees not infrequently board with the family and are obliged to sleep in objectionable rooms. All such provisions should come up to a reasonable standard as regards salubrity, air space, light, heat, and ventilation, and separate provisions should be required for males and females and youthful employees. Lodging houses should come up to a certain standard, and wash and bath rooms and suitable tiolet facilities should be provided. Special attention should be paid to general cleanliness within and without quarters for working parties, and to the character and preparation of food.

PERMANENT EXPOSITIONS DEVOTED TO INDUSTRIAL AND SOCIAL BETTERMENT OF WAGE-EARNERS.

It will require time and patience to bring employers and workers to a full realization of the dangers incident to the various occupations and to a thorough appreciation of the methods which have been proposed in the way of factory sanitation, safety devices, etc. Good results abroad have been accomplished by a permanent exposition devoted to social and industrial betterment for wage-earners. Such an exposition was provided for by the German Parliament a few years ago, and a similar effort is now being made in the city of New York. The German exposition occupies a building specially erected for the purpose at Charlottenburg, a suburb of Berlin, and here every safety appliance which inventive genius has devised can be seen in practical operation. The different labor unions appear to profit immensely by the special lectures and demonstrations which are given on Sundays, or, upon request, at any convenient time, by men formerly employed in "dangerous occupations." Apart from safety devices for machinery and appliances for removal of dust and injurious gases, all improved methods calculated to diminish danger, as, for example, in the manufacture of white lead, etc., are illustrated by models and descriptive text, printed leaflets being distributed free of charge. Here, too, may be seen the best and most recent types of respirators, wire masks, goggles, illuminating appliances, and safety working suits. Inventors and designers esteem it a great honor to have their products admitted for exposition. Only meritorious objects are displayed, and they are replaced by the newer and more satisfactory types. One of the most interesting collections consists of a series of bottles containing different varieties of dust, a series of photographs showing the microscopical character of this dust, and, last but not least, anatomical specimens and microscopical slides showing the effects of dust upon the air-passages and lungs of the human subject. Models, plans, and photographs of tenements and model homes for wage-

earners, exterior and interior decorations, literature, and charts concerning industrial betterment, all find a prominent place in the exhibit. The display of foodstuffs, their nutritive and economic value, together with instructive leaflets, form part of this interesting exposition. A popular pamphlet seen at the exposition in September, 1907, was compiled by Professor Kalle and Doctor Schellenberg, entitled "How to keep well and capacitated for work," which is sold by the Society for Popular Education at 2½ cents a copy, over 470,000 so far having been sold.

Chapter XIV.

WHAT THE FEDERAL GOVERNMENT MAY DO FOR THE PROMOTION OF THE WELFARE OF ITS EMPLOYEES, ETC.

Much excellent work has been and is being done by the United States Bureau of Labor in the collection and publication of facts concerning every phase of industrial and social betterment. These bulletins are issued bimonthly, and if carefully read can not fail to exert a tremendous educational influence upon those for whom they are primarily intended, viz, the wage-earners and employers. But while much has been achieved more remains to be accomplished. It seems to the writer that apart from establishing, in connection with the National Museum, a permanent exposition relating to industrial and social betterment of wage-earners, it is clearly the duty of the Federal Government to establish and adopt a standard of industrial hygiene for all the government workshops.

President Roosevelt, in a message to Congress December, 1907, has said:

> The National Government should be a model employer. It should demand the highest quality of service from each of its employees and it should care for all of them properly in return. Congress should adopt legislation providing for limited but definite compensation for accidents to all workmen within the scope of the federal power, including employees of navy-yards and arsenals.

We regret to say that with the possible exception of the extraordinary efforts and special precautions exercised to protect the health and general welfare of the employees in the operations connected with the construction of the canal on the Isthmus of Panama, the sanitation of offices and workshops in this country proper, for government employees, is not even on a par with some of the best private industrial concerns. There can be no question that model government workshops and efforts for the promotion of the general welfare of the employees would prove a salutary precept and example. The General Government is not in a position to legislate for the States, but it can at least enact a model labor and factory law for the District of Columbia, and all of the workshops connected with the army and navy arsenals, gun factories, powder depots, clothing depots, and the immense army of labor employed on the Isthmus of Panama.

Apart from strictly sanitary measures for the promotion and preservation of health, the Government, as a model employer, should provide some adequate relief in case of sickness, accidents, or disability from disease or injuries contracted in the line of duty. As it is now, the Government merely grants one month's sick leave to offi-

cials and office employees, none to workmen employed in government shops, and in case of accidents the employee or his dependents have no remedy except recourse to the courts of law.

While it is true that government employees in many instances have banded together for the purpose of establishing sick benefit and relief associations, such organizations lack official control and do not always embody the most advanced principles of social and political economy.

GERMAN WORKINGMEN'S INSURANCE SYSTEM.

INDUSTRIAL INSURANCE.

For reasons briefly stated, the Federal Government would do a wise act, by creating the so-called industrial insurance system, for the sick, for accidents, disability and old age, for its own employees and others in the District of Columbia, and thus initiating a system which has proved to be a veritable blessing in many of the European countries. Any one who desires to become familiar with the "German workingmen's insurance" should not fail to read a digest in the Bulletin of the Bureau of Labor No. 53, July, 1904, page 941, and Professor Henderson's "Summary of European Laws on Industrial Insurance." (Charities, December 7, 1907, p. 1191.) *

Under the operation of the German law, enacted in 1883, all workmen employed in commerce, industry and the handicraft trades, and whose wage is less than 2,000 marks (about $480) must be insured. By special regulations this requirement may be extended to agricultural and household employees. To secure the enrollment of individuals "for sick benefits," the employers in the industries subject to the law are required to send to the proper insurance fund the names of each person who enters or leaves their service.

The income of the sick funds is derived from the dues of members—the amount is fixed by each local association, but can not exceed 6 per cent of the members' wages. The employee pays two-thirds of the dues and the employer one-third. The employee's share is deducted from his wages and paid direct to the insurance fund by the employer, when he remits his own share.

The benefits offered by the sick funds vary in amount, but all of them are required to provide the following as a minimum: (1) Free medicine, attendance, and treatment. (2) In case the sickness causes inability to work, the fund pays a sick benefit equal to one-half the wage rate which was used in calculating the member's dues. This benefit begins the third day after the disability sets in, and continues for 26 weeks. Instead of receiving medical treatment at home a member is entitled to treatment at a hospital, in which case an amount not exceeding one-half of his daily wage is paid to his dependents. Female members receive similar benefits for a period of six weeks following confinement. (3) In case of death, a funeral benefit equal to twenty times the amount of his daily wage is paid to the heirs of a member.

In 1904 there were 22,912 local sick and miners' provident associations in the German Empire with 11,400,000 members, practically

* The writer is indebted to these sources for much of the information on this subject and gratefully acknowledges this indebtedness.

one-fifth of the population. The disbursements amounted to 237,107,000 marks (about $56,470,000). Of this amount 106,000,000 marks (about $25,238,000) was paid for sick benefits, and the remainder for medical and hospital treatment, convalescence and funeral benefits.

ACCIDENT INSURANCE.

Under the provisions of the laws of 1884, 1887, and 1900, all workingmen and technical experts engaged in industry, agriculture, forestry, transportation, and coast fisheries earning less than 3,000 marks (or about $715) per annum, are required to be insured against accident. By special enactment it may be extended to foremen and petty employers with more than 3,000 marks income. This form of insurance is administered by associations of employers known as "mutual trades associations," subject to federal supervision. In 1904 there were 114 associations, including 5,300,000 establishments and 17,500,000 workmen. The workingman's share of the expense of the accident insurance consists of the benefits paid out of the sick insurance fund to the injured person during the first thirteen weeks of disability. The share of the employer is determined from the amount of his pay roll and the danger rate of occupation. Beginning with the fourteenth week the trades association provides (1) free medical treatment; (2) a pension during the continuation of the disability, whether the disability is partial or complete. In case of complete disability the pension is equal to two-thirds of the earnings of the injured person; in case of partial disability the insured receives a fraction of the above pension, proportioned to the degree of disability.

In case of a fatal accident, the law provides for (1) a funeral benefit of not less than $12; (2) a pension to the dependents of the deceased, including parents, beginning with the day of death. The widow and each child up to the age of 15 receives 20 per cent of the earnings of the deceased, though the sum of these pensions may not exceed 60 per cent of such earnings.

Premiums paid in 1904 were $35,592,000; disbursements, $30,552,000, viz, to 758,392 injured members, to 65,503 widows, 97,246 children, and to 3,647 parents of those killed.

INVALID AND OLD-AGE PENSIONS.

Invalid and old-age pensions were made compulsory under the German law of 1889 (revised in 1899) for all wage-earners with an income of less than $480 per annum; the provisions may also be extended to include petty employers and persons in household industry. The invalid pension is paid without regard to age to those persons whose earning capacity has been permanently reduced to less than one-third. The pension is also paid to those who have been in a state of disability for twenty-six weeks and continues as long as the disability lasts. To be eligible for this pension, the insured person must have been a member of the "insurance institute" for two hundred weeks, during which time not less than 100 payments of weekly dues must have been made. If the disability has been incurred purposely the right to a pension ceases and the offender is liable to criminal prosecution.

In addition to the pension from the "insurance institutes" the Empire grants a stipend of 50 marks (about $12) per annum to invalids, as well as persons over 70 years of age.

Members are divided into five classes on the basis of wages received. Each class pays a different rate of dues and receives benefits in proportion. The lowest invalidity pension granted is $27.70, the highest is $107.10 per annum. The dues range from 3½ cents per week, according to the wage class in which the member is enrolled. One-half of the amount is paid by the employer and one-half by the employee.

The old-age pension is paid without regard to earning capacity when the seventieth year of age is completed. Members must have paid dues for one thousand two hundred weeks before they become eligible for such a pension. In 1904 there were 40 inavlid pension organizations, with 13,800,000 insured members. Premiums paid in, $36,060,000; disbursements, $35,520,000. The average invalid pension is $37.20, and the old-age pension $37.68, varying in amount with the wage class.

The financial soundness of the system is secured by making the employers, the guilds, and parishes eventually responsible for any deficit in the various sick insurance organizations. The national, state, and local governments guarantee the payment of claims against the accident and invalidity insurance organizations.

SYNOPSIS OF PRACTICAL RESULTS.

The financial status of the workingmen has been improved at least to the extent of the benefits received from the amounts contributed by the employers and the Government. Experience has shown that employers have not deducted their share of the dues from wages.

The hygienic conditions of the workingmen have been improved, both on account of the safeguards which the accident insurance organizations require employers to use and because of the special efforts made by the "sick funds" to reduce the sick rate among the members to a minimum. The general knowledge in regard to the preservation and promotion of health, which the "sick fund organizations" have disseminated by means of circulars, monographs, popular lectures, etc., have exerted a tremendous educational influence in the promotion of health and morals. One of the most beneficent features of the entire system has been that parts of the funds of these organizations are invested in model houses, hospitals, and sanitoria for the use of members. The writer, during his visit to Berlin in the autumn of 1907, had occasion to inspect some of these workingmen's houses, as well as the most complete and elaborate sanatorium in the world, at Beelitz, near Berlin. The object of this is to provide the very best facilities for the speedy recovery and the restoration of earning power of the industrial wage-earner. Doctor Bielefeldt (Med. Reform, 15th Jahrg, 1907, p. 238) calculates that in the treatment of 159,802 tuberculous patients between 1897 and 1906 the net gain, in spite of an expenditure of 56,000,000 marks, amounted to more than 4,500,000. It is interesting to note that the Prussian "insurance institutes and sick funds" in 1907 alone maintained 28 hospitals and sanatoria, the latter chiefly for consumptives and convalescents. One of the latest features was the establishment in 1902 of a special hospital for sexual diseases in the male, at Lichtenberg, near Berlin, and a sanitorium

for nervous and anæmic female wage-earners in Pyrmont (Hannover); all upon the principle that it is in the highest degree good economy to restore as speedily as possible the unproductive to the ranks of the producers. Some conception of the good work may be found by a brief description of the sanatorium at Beelitz, which was erected in 1902 by the "insurance institute" of Berlin at a cost, according to report of directors, June, 1907, of 15,287,994 marks. Average number of patients, 413 males and 203 females; number of cases treated in 1906, 4,192; number of hospital days, 212,457; expense for 1906, 1,470,062.25 marks, or at the rate per capita per day of 6.92 marks. One portion of the institution is devoted to the treatment of incipient cases of tuberculosis; another, and entirely detached department, to cases of every description requiring high-grade sanatorium treatment in order to prevent premature invalidity. Each of the handsome and spacious pavilions accommodates 200 males or 100 females; apart from these are 4 porters' lodges for the 4 departments under separate inclosures, 1 general administration building, 1 central power and heating plant, 1 central bathing establishment, 1 disinfecting plant, 3 pumping stations, kitchen, laundry, workshops, quarters for medical officers, employees, bowling alleys, hothouses, stables, etc. The hospital staff consists of 10 physicians and 128 employees.

The writer was informed in September, 1907, that since the establishment of the "sick funds" and "insurance institutes" in Germany, poverty has decreased and the number of patients treated wholly at public expense has markedly diminished, as workingmen, even of the humbler classes, prefer to devote their sick benefits to hospital care, rather than be a charge upon the parish or country.

Income, expenditures, and invested funds of the insurance system.

Item.	Sick insurance, 1901.	Accident insurance, 1902.	Old-age and invalidity insurance, 1902.	Total of all insurance, 1885 to 1901.
Dues of employers	$13,952,723	$29,907,868	$16,539,308	$508,445,565
Dues of employees	31,126,584	.....	16,539,308	487,147,059
Subsidy of Imperial Government	.....	.....	9,008,227	51,049,907
Interest and other income	2,604,130	3,743,936	8,054,310	93,588,044
Total income	47,683,437	33,651,804	50,141,153	1,140,230,575
Expenses for relief	43,595,450	25,735,679	28,658,559	755,015,720
Cost of administration	2,590,837	3,965,983	2,813,541	79,993,721
Total expenditures	46,186,287	29,701,662	31,502,100	835,009,441
Invested funds	44,421,557	47,301,235	239,779,052	309,020,218

EFFECTS OF THE INSURANCE SYSTEM ON THE EMPLOYER AND CONSUMER.

The foregoing table shows that the system has materially added to the financial burdens of the employer, but it is believed that they have not been too heavy; at least they have not injured Germany's ability to compete in foreign markets.

One authority estimates that the amount paid by the employer for accident insurance is 3 per cent of the wages, for sick insurance 1½ per cent of the wages, and for old-age and invalidity insurance, 1 per cent, or a total of 5½ per cent of the wages added to the cost of production. Doctor Lass, of the imperial insurance office, concludes,

however, that this burden has not been shifted to wages, nor has it resulted in higher prices to the consumer, but has been made up by improved methods of production.

The writer has purposely devoted much space to the German industrial insurance system, because he realizes that sickness and funerals are the most potent causes of poverty and distress; he knows from personal knowledge that prior to 1883 Germany depended upon employers' liability laws, charitable organizations, and private companies for the protection of her wage-earners, with very questionable results. While much has been achieved in other directions for the prevention of disease, the most distinct gain in social-political endeavors was made by the enactment of these laws, and especially the law of June, 1889, authorizing "insurance institutes" to invest part of their funds in hospitals and sanatoria, thus affording the best possible facilities for the speedy recovery and the prevention as far as practicable of permanent disabilities.

According to Zacher (Leitfaden zur Arbeiterversicherung des Deutschen Reiches, 1906), quoted by Professor Henderson, "at the end of 1905 in all 70,000,000 pensioners (sick, injured, invalids, and their dependents) had received $1,200,000,000 in benefits. The workmen have contributed less than one-half of the premiums, and have received $180,000,000 more than they have paid out. Property is owned to the amount of $108,000,000, of which $120,000,000 have been invested in workmen's dwellings, hospitals, and convalescent homes, sanatoria, baths, and similar institutions of welfare."

There is no pauperization in a method where the beneficiary contributes such a large share to the undertaking. As a matter of fact, methods in vogue in our own country are calculated to shift all of the burden upon the taxpayer.

For a more complete exhibit, the following tables are reproduced from Professor Henderson's article in Charities, December 7, 1907:

SICKNESS INSURANCE (SINCE 1885).

	Marks.	United States equivalent.
Sickness payments	1,114,629,489	$267,500,077.36
Physicians	514,803,920	123,552,940.80
Medicines, etc	402,757,651	96,661,836.24
Hospitals	303,061,148	72,734,675.52
Death benefits	83,763,839	20,103,321.36
Lying-in women	36,543,672	8,770,481.28
Various benefits	38,414,074	9,219,377.76
1885-1904	2,493,973,793	598,553,710.32
1905	250,000,000	60,000,000.00
In round numbers	2,744,000,000	658,560,000.00

ACCIDENT INSURANCE (SINCE 1885).

Accident benefits	759,172,928	$182,201,502 72
Payments to dependents of deceased	191,777,559	46,026,614.16
Medical care	34,275,716	8,226,171.84
Hospitals	55,010,333	13,202,479.92
Death benefits	6,927,990	1,662,717.60
Widows	7,747,570	1,859,416.80
Foreigners	2,846,489	683,157.36
1885-1904	1,057,758,585	253,862,060.40
1905	136,000,000	32,640,000.00
In round numbers	1,194,000,000	286,560,000.00

INVALID AND OLD-AGE PENSIONS (SINCE 1891).

	Marks.	United States equivalent.
Invalid pensions	560,486,961	$134,516,870.64
Old-age pensions	336,472,378	80,753,370.72
Medical care	55,371,747	13,289,219.28
Return of premiums:		
At marriage	38,025,117	9,126,028.08
At death	18,422,506	8,221,401.92
At accident	171,201	41,088.24
1891–1904	1,003,949,912	240,947,978.88
1905	162,000,000	38,880,000.00
In round numbers	1,166,000,000	279,840,000.00

It is sincerely hoped that the wage-earners of this country may profit by the experience elsewhere by the adoption of a similar system, and thus avoid the dangers and losses to which they are now so frequently subjected by unscrupulously managed insurance concerns.

There appears to be no good reason why the National Government should not inaugurate such a system for its own employees. In this connection it may be well to refer to a most successful precedent in the establishment of the United States Soldiers' Home in Washington. This institution was founded in 1851 with $100,000 paid as indemnity by the City of Mexico. Every soldier is taxed at the rate of 12½ cents per month, which is deducted from his pay. This together with the fines from courts-martial and forfeited pay from deserters is turned into the treasury of the home. The home now owns property costing over $2,500,000, accommodates 950 inmates, pays a commutation at the rate of $8 per month to soldiers having dependents and unable to avail themselves of the privileges of the home, amounting to about $20,000 a year, and still has a reserve fund of about $4,000,000.

CHAPTER XV.

WHAT THE EMPLOYER MAY DO FOR THE WELFARE OF EMPLOYEES.

It has been stated at the outset that social betterment can not be disassociated from industrial betterment, and it is here that the employer can do much for the welfare of his employees. Apart from a cheerful compliance with the laws and ordinances which may, from time to time, be enacted for the protection of the working classes, it is clearly the duty of the employer to promote in every way the efficiency and earning power of the wage-earner and to pay such wages as are necessary to improve the standard of living among poorly paid employees.

There is no doubt that thoughtful employers generally realize that they are not only responsible for the proper technical training of apprentices, but also for their habits, and a gratifying number of establishments have made every effort to surround them with all possible chances for improvement, mentally and morally. There is a class of youthful employees, both males and females, for whom the writer begs to enter a special plea; they are entitled to every consideration, because, either as a result of inheritance or faulty environments, they

have acquired a general inaptitude; they are perfectly willing to work, but awkward in all their movements—simply do not know how to work—and soon exhaust the patience of their instructors.

Such persons are found seeking to make an honest living in nearly all occupations, and while they may be better adapted to some employments than others, to discharge them without a fair trial means their utter ruin. Here appears to be a field for human sympathy, and special pains should be taken to teach them, by patient fellow-workmen, how to handle tools and work to better advantage, whether it is with the pick or shovel, at the ploughshare, the street or house broom, or in the diversified employments of artisans' workshops.

INDUSTRIAL BETTERMENT.

Space will not permit to enter into details concerning efforts which have been made at home and abroad in the promotion of the general welfare of the working classes. At a meeting of the American Social Science Association, held in Washington, April 18, 1901, Mr. J. H. Patterson, Dayton, Ohio, read a paper on factory sanitation and described a large manufacturing plant of which he is the head, and their close adherence to the principles of hygiene and the uplifting of mankind. The interior of the factory is painted in cheerful colors, extra windows were made to give light, forced ventilation to afford plenty of fresh air, and all dust and acid fumes are carried away by exhaust fans. Bathrooms and well-furnished toilet rooms are on all the floors. All seats have backs. Clean aprons are furnished by the company, and a dining room where hot meals are served and a course in domestic economy is conducted. The grounds around the factory and the houses of the employees are healthful and attractive. "We have demonstrated," said Mr. Patterson, "that this system pays the employee, the manufacturer, and the buyer, in the health of one, profit of the second, and the improved quality of the product purchased by the third." Bulletin No. 31, Department of Labor, November, 1900, contains an article on betterment of industrial conditions, showing what has elsewhere been accomplished, every effort being in the right direction. Among the most important may be mentioned (1) the increasing of industrial efficiency through industrial schools and manual training classes; (2) the care for employees' health and comfort by means of bathing facilities, gymnasiums, calisthenics, baseball, bicycle clubs, dining and lunch rooms, the furnishing of hot lunches free, or at cost, improved sanitary conditions and appliances; (3) the improvement of domestic conditions by means of improved dwellings, instruction in sewing, cooking and housekeeping, in landscape and kitchen gardening, and the exterior and interior decorations of homes; (4) the care of sick and disabled employees and their families by means of free insurance, medical attendance and hospital facilities, and by the encouragement of beneficial organizations; (5) club organizations for social, recreative, and intellectual purposes by means of free lectures, libraries, kindergartens and educational classes, social gatherings, summer outings, meeting places, game rooms, banquets, dances, etc.; (6) the encouragement of musical and dramatic clubs and the promotion of spiritual life by means of Sunday schools and general religious work; (7) the cultivation of thrift

through savings-bank facilities, building associations, or provident organizations, rewards for valuable suggestions of employees, for faithful service or the manifestation of zeal and interest in their employment; (8) the promotion of employees' personal interest in the successful conduct of the business by encouraging and assisting them to purchase shares, financial aid to employees in case of unusual hardships and distress, and the cultivation of cordial and even confidential relations between employer and employees. (For details consult Bulletin of the Department of Labor No. 31, pp. 1117–1156.)

It is gratifying to note that, although Washington is not an industrial center, a large number of firms have taken steps for the promotion of the general welfare of employees.

CHAPTER XVI.

WHAT THE GENERAL PUBLIC MAY DO.

There is a tendency at present among young men, the sons of parents who have accumulated some means, to expect to live and grow rich without manual labor. It is becoming fashionable to look upon the mechanic with disdain, to consider manual labor degrading, an evidence of low breeding, and all such nonsense. The young men want to be bookkeepers, bankers, lawyers, doctors, or office holders, anything which does not involve manual labor, and expect their fathers to furnish the means to attain the goal of their ambition; as a result the professions are overcrowded and men fail who might have been successful in the handicrafts. Let us teach our children to respect and perform honest labor, whether it is behind the plowshare, in the saddle, or in the workshops. It will teach them self-reliance, prudence, and perseverence.

It will be conceded that the burdens of improving industrial and social conditions should not be carried by the employer and employees alone. There are many phases of vital importance from the standpoint of public health and humanity which should concern every thoughtful man and woman. Reference has already been made to the appalling and dangerous conditions under which many of the trades and occupations are carried on in tenement houses. While this is, in part, due to the greed of the manufacturer, because it means less factory space, less rent, light, fuel, and a decidedly smaller pay roll, the consumer is equally to blame, because of his constant demand for cheaper goods, quite oblivious to the fact that the garments may be a source of danger from infectious diseases, and are stained with the sweat and blood of helpless women and little children.

During one of the presidential campaigns a clever orator referred to Glasgow, and told us that 41,000 of the 100,000 laboring families of that manufacturing center lived in 1-room tenements, and that this one room for a family of father, mother, daughters, and sons told what the wages in Scotland were and how they dragged humanity down into bestiality and misery. We need not go to Glasgow for such illustrations, for to our shame it must be confessed that similar conditions obtain in nearly every American industrial city. The effects of such conditions upon death rates will be presently referred to. In the meantime, it will be readily conceded that the people do

not live as a rule in such quarters from choice, but from sheer necessity. Low wages compel the working classes not only to find shelter in houses unfit for human occupation, but also affect their health and the health of their children by insufficient food and clothing, and last, but not least, it means the utilization of child and female labor in some of the most atrocious forms referred to on another page. Indeed, there is much reason for assuming that low standards of living, which insufficient wages tend to beget, play a very important rôle in physical, mental, and moral degeneracy. "Physical health is the basis of mental health." This aphorism of Aristotle has been proved to be true by the experience of every educator.

Professor Dawson, in his study of youthful degeneracy (Pedagogical Seminary, Vol. IV, p. 2), found among the boys and girls in reform schools evidence of physical degeneracy as shown by lighter weights, shorter statures, and diminished muscular power, and declared that 16 per cent of those examined by him were "clearly sufferers from low nutrition." It is to be hoped that the public conscience may be sufficiently aroused to insist upon adequate wages for all classes, and that the producer and consumer alike will be willing to assume this responsibility, not as a matter of charity, but in justice to the laboring classes.

In the whole range of social betterment and sanitation, especially in our efforts to combat tuberculosis, no field affords better opportunity for philanthropic work than the erection of sanitary homes for wage-earners, at reasonable rentals, the encouragement of cooking schools, and the establishment of model lodging and eating houses. The new York City and Suburban Homes Company has now for dividend disbursements 4.5 per cent a year on an investment of $5,500,000. The Washington Housing Companies have an investment of over one million, have paid, respectively, 4 and 5 per cent from the very inception of the companies, and have a surplus fund of over $100,000. London has more than $100,000,000 invested in model tenements.

HOUSES FOR WAGE-EARNERS.

The housing of the working classes has very properly been made the subject of legislation in many countries, and is a matter in which factory owners, labor unions, and the general public should be deeply and mutually interested. There are several systems of dwellings for artisans and laborers, viz, individual houses or cottages, a row of houses under one roof, and the so-called "flats." Preference should be given, when practicable, to the cottage system, but in large cities unfortunately the value of real estate frequently compels the erection of large tenements, and in such an event the State should insist upon hygienic requirements as regards air space, light, and ventilation. No home can be considered sanitary where one room has to answer the purposes of a living room, sleeping room, and kitchen or where the water-closet or privy is used by more than one family.

EVIL EFFECTS OF INSANITARY HOUSES AND OVERCROWDING.

The primary object of habitations is to secure protection from the influence of heat, cold, rain, sunshine, and storms, and thus promote the health and happiness and indirectly also the morals and culture of the human race.

The influence of sanitary houses can not be overestimated. Doctor Villermé, in an investigation in France from 1821 to 1827, found that among the inhabitants of arrondissements containing 7 per cent of badly constructed dwellings, 1 person out of every 72 died; of inhabitants of arrondissements containing 22 per cent of badly constructed dwellings, 1 out of 65 died, while of the inhabitants of arrondissements containing 38 per cent of badly constructed dwellings, 1 out of every 15 died.

With the present rapid transit facilities in every city, our voice should be clearly in favor of individual homes; and when this is impracticable, we should insist on broad streets and deep yards. No more than 68 per cent of the lot should be covered by the house, and the height of the building should never exceed the width of the street. The baneful effects of tenement houses should be avoided, as infectious diseases are more liable to spread in consequence of aerial infection and the more intimate contact of the occupants.

Apart from structural defects, there is no doubt that the death rate is largely determined by the number of occupants to a room. Russell has shown that in Glasgow, when the average number of persons to each room was only 1.31, the mortality was 21.7 per 1,000, and when the number of occupants amounted to 2.05 for each room, the mortality reached 28.6 per 1,000.

According to Körösi, the mortality from infectious diseases at Budapest is only 20 when the number of occupants to each room does not exceed 2, but is 29 per 1,000 with 3.5 occupants, 32 per 1,000 with 6.10 occupants, and 79 per 1,000 when there are more than 10 occupants to each apartment.

The death rate at Berlin, in 1885, among the 73,000 one-room tenements was 163.5 per 1,000, against 5.4 per 1,000 among 398,000 residents occupying four or more room apartments.[a] The analysis of 2,701 infantile deaths in Berlin during 1903, investigated by Neumann, has been presented elsewhere in this work.

Insanitary dwellings are to be found everywhere, and particularly in older cities, erected at a time when the principles of sanitation were comparatively unknown. One of the most important municipal problems is to correct existing evils by the enactment and enforcement of suitable laws. It requires, however, a strong public sentiment to bring about a complete and satisfactory reformation, as evidenced by the housing movement elsewhere, for in spite of the excellent tenement-house laws in New York, according to Homer Folks, of 370,000 dark rooms reported in existence by the De Forest tenement-house department in 1903, some 20,000 only have been opened to the light during the past three and a half years. The prohibition against the use of cellar and basement rooms partly underground can not be enforced, owing to the lack of a sufficient number of inspectors. The notorious "Lung Block" continues to contribute its horrifying quota to the annual mortality. (Charities, November 30, 1907.)

The writer has no hesitation in declaring that the housing conditions of the least resourceful of people have been, and are even now, more potent than any other factor in helping to swell the frightful

[a] Town and City, Jewett, p. 14.

mortality from consumption and other so-called house diseases engendered by unwholesome environment.

HOUSE DISEASES.

It has long been known that rickets, scrofula, and other chronic forms of tuberculosis are especially prevalent in dark, damp, and insanitary houses. The children are anæmic and as puny as plants reared without the stimulating effects of sunlight. Add to this the fact that dampness abstracts an undue amount of animal heat, lowers the power of resistance, and favors the development of catarrhal conditions, which render the system more vulnerable to tuberculosis, and we have a reasonable explanation why these diseases prevail, especially in basements or houses below grade and otherwise unfit for human habitation. The death rate is often double and treble that of other localities, and while there are doubtless other factors which determine the frightful mortality, none are more potent than deficient sunlight and ventilation. Diphtheria, cerebro-spinal meningitis, acute and chronic rheumatism, and bronchial affections are also more frequent in insanitary dwellings.

That the same is true of infantile diarrhea is doubtless due to the fact that the construction of the buildings does not protect from the heat of summer, and the enervating effects of heat and the more speedy decomposition of food (especially of milk) in such an atmosphere, combine to carry on the slaughter of the innocents.

The existence of disease-breeding habitations is a reflection upon Christian civilization, and there should be sufficient human sympathy to provide decent, healthful homes for our wage-earners, who constitute, after all, the bone and sinew of the country; and this is one of the occasions when we may well act as our brother's keeper.

The history of improved dwellings reveals everywhere a lessened death rate, and the experience of the Washington Sanitary Improvement Company is equally gratifying. During the year ending December 31, 1906, the apartments were occupied by 778 adults and 380 children, total, 1,158; births, 39 and only 16 deaths, 10 adults and 6 infants, a death rate of about 13.7 per 1,000—which, with all due allowance for the average age of the occupants, shows a remarkbly low mortality when compared with the general death rate among the white population of 15.16 per 1,000.

This regeneration of the housing conditions for the least resourceful people is the great sanitary and social problem of the twentieth century.

Take away the hovels and filthy places, let sunshine and pure air circulate through their homes, and teach them habits of cleanliness and responsibility, and the first step toward the elevation of the degraded and the education of the ignorant will be taken, not only in the warfare against tuberculosis and other diseases engendered by insanitary surroundings, but also in the battle for higher moral and social standards.

LODGING HOUSES OR HOMES FOR WAGE-EARNERS.

Those who have read "The Long Day" can not fail to be impressed with the just criticism of our present system of homes for

working girls. The author makes a strong plea for homes designed after the Mills hotels for workingmen; no charity, but so built and conducted that they will pay a 4 per cent rate of interest upon the money invested. "A clean room and three wholesomely cooked meals a day can be furnished to working girls at a price such as would make it possible for them to live honestly on the small wages of the factory or store. We do not ask for luxuries or dainties. In the model lodging house there should be perfect liberty of conduct and action on the part of the guests, who will not be 'inmates' in any sense of the word so long as the conventions of ordinary social life are complied with."

It is to be hoped that her simple but truthful story will be read and her appeal for industrial and social betterment answered. So long as the conditions described in the book exist, so long will it be wicked to rear magnificent and costly church edifices, and in this respect Christian civilization, which should be a strong factor in uplifting and regenerative influences, has been remiss in its sacred obligations. To supply the needs spoken of, together with the establishment of cooking schools and kindergartens so that the children of toil may at least have an opportunity to learn to work intelligently, may be regarded as a suitable field for practical Christianity, and would do much toward narrowing the breach which now exists between the church and wage-earners and between capital and labor.

FOOD FOR WORKING CLASSES.

While the character and variety of food now served is very much better than it was fifty years ago, it is not what it should be, especially in lodging houses. The chief faults consist in improper cooking and the widespread error of consuming a cold dinner from the lunch basket or dinner bucket.

The art of cooking and how to supply good wholesome food and in proper quantities should be made the subject of popular instruction. The "Ladies Sanitary Association of England" deserves credit for having taken this matter in hand, especially since experience teaches that nothing prevents the abuse of alcohol so much as a sufficient and palatable supply of food.

The establishment of public kitchens and eating houses for unmarried laborers conducted upon practical sanitary and economic principles would prove a great blessing; the same may be said of lunch rooms where rolls, sandwiches, a cup of coffee, tea, milk, hot soups, etc., may be obtained at a nominal cost, and which would materially lessen the evils of intemperance.

Since coffee and tea allay thirst and are stimulants, without the depressing effects of alcoholics, there is no reason why factories and workshops should not supply these beverages at noon to employees at actual cost. The subject of food and cooking will be discussed in a special paper.

CHAPTER XVII.

WHAT THE EMPLOYEE MAY DO TO CONTRIBUTE TO HIS OWN WELFARE.

Sufficient has been said in the preceding pages to indicate the dangers to which the working classes are exposed in many industrial pursuits, and the methods proposed to alleviate the effects have also been pointed out. It must be conceded that all remedial efforts have been prompted by the true spirit of humanity and as a social duty; hence it is reasonable to expect that wage-earners should show a willingness to avail themselves of the various "safety devices" and not underrate their importance in the protection of life and limb. While it is criminal for employers not to provide suitable protection, it is equally culpable on the part of the operatives to disregard all such preventive measures. So, for example, it is not a pleasing reflection to be told by Doctor Harrington, professor of hygiene at the Harvard Medical School, in speaking of respirators, that "Aside from the discomfort caused, the operatives have another and a senseless objection to their use; women complaining that they are made to look ridiculous, and men being moved to discard them by the gibes of their more reckless fellows." In January, 1908, the writer visited Frankford Arsenal and found men working in high explosives without rubber gloves and respirators, although provided by the Government. (See p. 60). Doctor Farrand, Secretary of the National Association for the Study and Prevention of Tuberculosis, also spoke to me of the great difficulties he and others have encountered in New York and New Jersey in inducing the operatives to give safety devices a fair trial.

PART II.—SOCIAL BETTERMENT.

CHAPTER I.

HOW TO KEEP WELL AND CAPACITATED FOR WORK.

It is a matter of constant observation that families, even with a modest income, get along very well until sickness and death enters the once happy home; and if these financial burdens and sorrow can be prevented it is clearly our duty to do so, even if the "chief bread winner" is not himself incapacitated for work. For these reasons the writer offers a few suggestions along the lines of general and personal hygiene, with the hope that they may serve to diminish human suffering and distress. In doing so, while utilizing his own lecture material, he is indebted for the inspiration and popular presentation, as well as some of the subject-matter, to the valuable brochure by Prof. Fritz Kalle and Dr. Gustav Schellenberg "Wie erhält man sich gesund und erwerbsfähig, Berlin, 1907."

HOUSE AND HOME.

Special pains should be taken in the selection of living quarters, no matter how humble they may be, as they constitute our abode for the greater part of our life. With the excellent motor facilities, there is no reason why crowded tenements should be chosen, and preference should always be given to individual homes, or apartments, in not exceeding two-story tenements. The Germans have an old but true proverb: "Where the sun does not enter the doctor surely will;" hence dark, gloomy and damp houses should be avoided; moldy spots on the walls or ceilings and a close musty odor indicate dampness, and cheap rents should prove no inducement to occupy such quarters. Leaky roofs and down spouts, or a pile of ashes against a brick wall, may keep the house damp, and the causes should be promptly removed. In all such instances, as well as in the occupancy of a recently constructed house, it is very desirable to dry out the house by heat and open windows.

Since we know that the mortality from contagious diseases increases in proportion to the number of inmates of the rooms, hygiene requires that even the most modest dwellings should afford sufficient room to prevent overcrowding. Ventilation is always necessary, but open windows are especially indicated at night, as nothing can take the place of pure fresh air in small quarters. This may be effectively accomplished without the danger of drafts by opening the window in the bedrooms from the top, and those of the adjoining room at the bottom. Night air, contrary to popular opinion, is not unwholesome. The only danger is from mosquitoes, which should be excluded by proper screening of windows and doors.

There are many families who properly insist upon having a sitting room or parlor, which is most commendable, if the bedrooms are large enough to afford 500 cubic feet of air space for each occupant. If they do not, it is desirable after proper airing of the larger rooms to utilize them for sleeping purposes, for it must be remembered that the air of habitations is vitiated by the consumption of oxygen and the exhalation of carbonic acid. The airing of rooms is even more essential in cold weather, because of the additional pollution by carbonic acid from light and fires. There are a number of families, unfortunately, who for various reasons are obliged to live, cook, and sleep in one room, and for whom the question of fresh air is therefore of vital importance. Such families should not hesitate to avail themselves of the benefit of fresh air, especially when medical science has demonstrated the advantages of fresh and even cold air in the treatment of consumption and pneumonia, provided the body is kept warm by sufficient bedclothes.

The household dust is as objectionable in many respects as the dust of workshops, because dust and germs always go hand in hand. So, for example, Uffelmann found that while the outer air contained only 250 germs in 10 cubic feet the air of his library contained 2,900, of his sitting room 7,500, of his bedroom 12,500 and the air of a living room of a workingman's family as many as 31,000 germs. He also demonstrated that they increased after disturbing the dust of the rooms by feather dusters or by slamming the doors, showing that they actually cling to the household dust. If the dust should happen to contain the germs of tuberculosis, from carelessly expectorated sputum, or which may have been carried into the house upon the soles of footwear, bottom of skirts, etc., such dust may prove a source of danger, especially to children.

HOUSE CLEANING.

For reasons just given, there should be no accumulation of dust in any part of the premises. Hygiene, therefore condemns all carpets and interior finishes which serve as dust and germ traps, such as heavy cornices, elaborate moldings of door and window frames, wardrobes, cumbersome draperies, and unnecessary furniture. Hygiene, on the other hand, approves of neatly polished floors with small rugs, which can be easily taken up and cleaned outside of the house, curves instead of cornices and angles, smooth and nonabsorbent walls, instead of embossed wall papers, simplicity of furniture, closets instead of bureaus and wardrobes. In brief, everything which will prevent the collection of dust and germs and facilitate their removal may be regarded as hygienic. So, for example, a plain, tinted, smooth wall, or the varnished wall papers, which can be cleaned with a damp cloth, or any smooth wall paper guaranteed to be free from arsenic, are in point of health superior to the embossed silk hangings and tapestries of the rich man's home.

The object of house cleaning is primarily to get rid of the dust and germs. In sweeping it is desirable, therefore, to open the upper windows, but to keep the door leading into the hall closed, so that the dust may not be wafted back into the house. The dusting should always be done with a soft, damp cloth, frequently changed. Under

no circumstances should the feather duster be used inside of the house, as it does not remove, but simply displaces the dust. If the cracks in floors have been neatly filled up, and the floors oiled or waxed, they can be cleaned with a damp cloth much more effectively than by the tiresome process of scrubbing, a drudgery to every neat housekeeper.

The kitchen, cooking, and eating utensils need special care, as unclean food and utensils are often the cause of cholera-morbus and diarrheal diseases. Captain Sanderson, in the Cook's Creed, published for the United States Army, in 1862, showed his sanitary acumen when he said:

> Better wear out your pans with scouring than your stomachs with purging, and it is less dangerous to work your elbows than your comrades' bowels. Dirt and grease betray the poor cook and destroy the poor soldier.

Every effort should be made to have clean and cool storage facilities for food, and all perishable food, especially milk for infant feeding, should be kept on ice whenever the temperature is above 60°.

TEMPERATURE.

The most healthful room temperature in cold weather is between 65° and 70°, as overheated rooms predispose to colds and should be avoided.

When the house or apartment is heated by cast-iron stoves or other heaters, special care is necessary not to bring them to a red heat, as the very dangerous coal gas is liable to escape through invisible fissures in the plate and joints while the heaters are red hot. It is desirable to select a good-sized heater lined with fire clay, which will not have to be brought to a red heat, and at the same time furnishes sufficient volume of warm air. If the air is superheated it acquires a peculiar odor, probably due to charring of organic dust; it also becomes very dry and irritating, owing to the rapid evaporation of moisture from the skin and mucous surfaces of the inmates, and in consequence is apt to produce catarrhal affections, conditions which do not prevail when care is taken and provisions made for the evaporation of a certain amount of water. Coal oil or gas stoves can not be recommended, unless provisions are made to carry off the products of combustion.

The danger from fire, which is always a great calamity, should be reduced to a minimum by preventing the accumulation of combustible material on the premises, proper care of matches, and instruction of the children. Coal oil, gasoline, etc., should never be used for kindling purposes; there is always great danger from explosions, fire, and fatal burns by filling a burning lamp, or extinguishing the wick by blowing over the chimney, or using a lamp when the chimney is broken.

INSECTS.

Special attention should be paid to the exclusion and destruction of house flies, mosquitoes, and other insects, for apart from the discomfort produced, there is much reason for assuming that disease germs may be conveyed by flies and mosquitoes, fleas, bedbugs, and roaches. Celli,* of Rome, in 1888, demonstrated that the germs of

*A. Celli Boll. dell. Soc. Lancis, degli, ospedali di Roma, 1888.

tuberculosis and other disease germs may retain their vitality after passing through the intestinal tract of flies. Spillmann [a] pointed out that flies caught while feeding upon the expectoration of a consumptive invariably contained viable germs, and Hoffmann [b] not only confirmed these observations, but also found the germs in the fly spots on the walls of a room occupied by a phthisical subject. The writer has declared it his opinion for years that flies may carry the germs on their feet, from typhoid stools and infected sources, to the food and milk supply, and in 1895 [c] pointed out a number of house infections in this city which could not be explained in any other way. The experience of the Spanish-American war appears to have fully confirmed this conclusion. In like manner, the germs of cholera and of the oriental pest have been disseminated by the house fly.

Professor Stiles, of the Public Health and Marine-Hospital Service, has shown that the eggs of the pork worm, whip worm, pin worm, and round worm may be carried by flies to the food and there is reason to believe that purulent affections of the eye and wound infections may be thus conveyed.

The evidence that certain species of mosquitoes are the intermediate host of the germs of malaria and yellow fever, and that man may be directly inoculated by the sting of these insects is absolutely conclusive. The efficacy of measures for the extermination of mosquitoes, and their exclusion from houses by proper screening, has been abundantly demonstrated both at home and abroad.

It is gratifying to know that the mystery of yellow fever was solved by the work of Surgeons Reed, Carroll, Lazear, and Agramonte of the United States Army, and Surgeons Gorgas and Keane have demonstrated the best methods for the prevention of yellow fever and malaria by waging an unceasing warfare against the mosquitoes.

Poultry, pigeons, and household pets, like dogs, cats, and parrots, ought not to be kept in the rooms, as they contaminate the air, harbor insects, and may even convey disease germs. It is held by a number of authors that diphtheria as observed in chickens, pigeons, and cats is identical with the human disease. Parrots suffer at times from a pulmonary disease, which is transmissible to man, while certain forms of skin disease and itch may be conveyed by dogs and cats.

There is some evidence to show that a certain tapeworm found in the dog and sometimes in children undergoes a larval stage in fleas and dog lice and when swallowed unconsciously by children may cause infection.

What has been said of the desirability of general cleanliness applies with equal force to the basement, cellar, attic, yard, outhouses, garbage cans, etc. There should be no accumulation of rubbish within or without the premises. Where no sewer connections exist, the outhouses should be kept in a clean condition, and the seats provided with lids so as to exclude flies. It is also a good plan to disinfect the vault or receptacle with chlorinated lime or fresh whitewash, etc.

A good housewife can not only accomplish a great deal for the health, but also for the comfort and morals of the family. As indi-

[a] Spillmann and Haushalter, Comptes rendus 105, p. 352.
[b] Hoffmann Deutsche Med. Zeitung, 1888, No. 57.
[c] Report of the Health Officer, District of Columbia, 1895.

cated by our German authors, general order and neatness, clean, white, washable curtains, some potted plants, and a few suitable pictures, avoiding the loud chromos, and a cheerful and refined atmosphere will do much toward keeping the husband and sons from the saloons.

As a matter of fact, much may be done to transform undesirable living quarters into healthful homes, while filth, neglect, and slovenly housekeeping often convert even structurally good houses into veritable hotbeds for disease germs. So, too, persons with delicate constitutions may, by attention to the laws of health, attain to a good old age, while the physical giant by a reckless life soon undermines his general health and goes to a premature grave.

CARE OF THE SKIN.

The skin is supplied with a network of blood vessels and nerves, and is a sensory, respiratory, excretory, and heat regulating organ. As a sensory organ, it combines with the tactile functions, the power of perceiving impressions of warmth and cold. The respiratory functions of the skin are limited, to be sure; nevertheless, small quantities of oxygen are absorbed and carbonic acid is eliminated. Apart from this, the skin on an average adult eliminates through the sweat glands about 2½ pounds of water a day. Human sweat contains about 2 per cent of solid constituents, mostly in the form of waste matter or impurities, and the odor varies in different regions of the body and in different races. The skin also secrets a fatty substance through the sebaceous glands. As the water from the skin evaporates, the solid matter remains upon the surface, combines with dirt, harbors germs, and readily undergoes decomposition, which, apart from the disagreeable odors so characteristic of unclean persons, also tends to macerate the skin and is liable to produce "galling or chafing," pimples, and boils.

Last, but not least, the accumulation of this matter would naturally close the pores of the perspiratory and sebaceous glands and throw the work of eliminating the impurities upon other organs.

A normal cutaneous function is doubtless of great hygienic importance, as shown by the occurrence of many diseases following its suppression, because in such an event, in addition to the retention of the waste matter in the blood, work is thrown upon the kidneys and other eliminating organs, and these, if already weakened, naturally break down. Since the functions of the skin depend not only upon its anatomical intactness, but also upon cleanliness and a proper tone of the cutaneous vessels and nerves, a rational culture of the skin demands: (1) that it should be freed regularly from the secretory products and particles of dirt; (2) that the cutaneous nerves retain their normal excitability or when impaired that they regain their tone; (3) that we assist the skin in its heat-regulating functions, so that it may not be overtaxed. All of which may be accomplished by ablutions, baths, and suitable clothing.

ABLUTIONS AND BATHS.

Regular and systematic ablutions with soap and water are requisite for reasons already given, and are especially necessary when engaged in dirty work or exposed to poisonous dust. In addition to the

chemical effects of soap, vigorous friction with a brush may be employed, not omitting the finger nails, as disease germs have been found in nail dirt.

The water used should not be too warm for the body, as this would relax the skin and increase the susceptibility to catching cold. If the bathing is not done in the bath tub, it will be well to wash and dry part of the body at a time. In any event the surface should be wiped dry and hard, especially the hair, since wet hair is calculated to produce colds. It is always a good plan to wash the neck and chest with cold water, so as to harden the skin.

We will now briefly refer to the different forms of baths. The cold bath is usually taken in a tub or by means of a shower or needle bath at a temperature of about 65° for adults. It should not last over three minutes. Cool baths vary from 65° to 80°. Tepid baths are taken at a temperature of between 80° to 90°, continued from ten to fifteen minutes. Warm baths vary from 90° to 100°, and are generally employed for their cleansing effect. In addition, there are steam or Russian baths, the Turkish or dry hot-air baths, river and ocean baths, swimming pools connected with public baths, medicated baths, etc. Swimming baths are particularly useful, as they also afford an opportunity for muscular exercise, and as the temperature of the water is rarely above 80°. Such baths are both cleansing and stimulating, and therefore an excellent tonic for the skin. All baths should be followed by a cool douche and friction with a rough towel should be employed until the skin is in a general glow. The value of bathing is so fully appreciated that the building regulations of this city compel a bathroom for every apartment offered for rent. No community should fail to make provisions for public baths, both in summer and winter. The beneficial effects upon the health and morals of the least resourceful people can not be too strongly emphasized. The old Roman baths were prominent features of the daily life of the Romans, and were counted among the choicest privileges. Eleven large and 826 smaller public institutions adorned the ancient capital during the Diocletian period, and the baths of Caracalla, the ruins of which can be seen to-day, could accommodate 1,600 bathers at one time.

The following sensible rules on the subject of bathing have been issued by the English Humane Society, and are well worth observing by bathers:

Avoid bathing within two hours after a meal. Avoid bathing when exhausted by fatigue or from any other cause. Avoid bathing when the body is cooling after perspiration. Avoid bathing altogether in the open air, if, after having been a short time in the water, there is a sense of chilliness, with numbness of the hands and feet, but bathe when the body is warm, provided no time is lost in getting into the water. Avoid chilling the body by sitting or standing undressed on the banks or in boats, after having been in the water. Avoid remaining too long in the water, but leave the water immediately if there is the slightest feeling of chilliness. The vigorous and strong may bathe early in the morning on an empty stomach. The young, and those who are weak, had better bathe two or three hours after meals; the best time for such is from two to three hours after breakfast. Those who are subject to giddiness or faintness, or suffer from palpitation or other sense of discomfort at the heart, should not bathe without first consulting their medical adviser.

CLOTHING.

The object of clothing, apart from the moral and æsthetic aspect, is to aid the skin in its heat-regulating functions. It should, there-

fore, afford protection against heat and cold, as well as rain and mechanical irritation. Clothing must be adapted to climate and seasons, and extremes should be avoided; as a general rule warm woolen goods are best suited for winter wear, and cotton or linen for warm weather. It should be understood, however, that flannels absorb more dirt, odors, germs, and water than linen or silk, whilst cotton occupies an intermediate position. The question of wet clothing, whether from perspiration or rain, is important, as the drying of clothing on the body involves an expenditure of animal heat, and it is not a matter of indifference whether this takes place rapidly or slowly. It is a fact that a wet cotton shirt or sweater feels more uncomfortable and colder than a wet woolen garment. The simple reason is that the cotton garment dries more rapidly, but it abstracts during the same time more animal heat than flannels. This fact is not without a practical bearing, as it teaches that persons who perspire easily will do well to wear flannels next to the skin, and this is all the more important when they are liable to draughts or abrupt changes in temperature.

As a protection against cold, wool is superior to either cotton or linen, and should be worn for all underclothing. In case of extreme cold, besides wool, leather, fur, or waterproof clothing, on account of their impermeability to air, are useful. As a protection against cold winds, for equal thickness, leather and india rubber take the first rank, wool the second. As a protection against rain, india rubber or oiled canvas clothing is the best, but it is an exceedingly hot dress, owing to its impermeability to air, which causes condensation and retention of the perspiration. To overcome this objection, Dumas suggests a material, which is waterproof and yet permeable, prepared as follows: The garment is placed in a 7 per cent solution of gelatine, heated to a temperature of 100° F. After immersion for a few minutes it is dried in the air and after drying it is soaked in a three-fourths of 1 per cent solution of alum and again dried.

As a protection against heat in the shade, the thickness and conducting power of the material are the only factors to be considered. Texture has nothing to do with protection from the direct solar rays; it depends entirely on color, and white is the best. As a protection against fire, leather clothing is generally worn. The fabric can be rendered noninflammable by the addition of 20 per cent of tungstate of soda and 3 per cent of phosphate of soda to ordinary starch sizing, while cotton or linen goods may be treated simply with starch and borax, in the proportion of a teaspoonful of borax to one-half pint of starch.

CLOTHING AS A CAUSE OF DISEASE.

Clothing may impair the functions of the body and cause disease (1) by improper fitting, which leads to compression of blood vessels and nerves and interferes with the normal position of organs and the movements of the body; (2) by improper selection of material affording either insufficient protection or overheating a part or the whole of the body; improper material may also produce irritation or interfere with the ventilation of the skin; (3) by wet clothing, which, in drying, may abstract sufficient animal heat to cause peripheral irritation and reflex internal congestions; (4) by poisonous dyes, such as

compounds of arsenic and antimony, chrome yellow, zinc chloride, and some of the aniline colors. The toxic symptoms may manifest themselves by general impairment of health or in local affections of the skin; (5) clothing may harbor disease germs, and a number of instances are on record in which itch, smallpox, tuberculosis, and scarlet fever have been spread by second-hand clothing and bedding. This points to the necessity of thorough disinfection

SPECIAL ARRANGEMENT OF DRESS.

The head dress.—As long as the head is covered with hair, the head dress should be permeable and not too warm, lest headache may be induced; on the other hand, insufficient covering may produce neuralgia and rheumatic affections.

The head and eyes should always be protected from the direct rays of the sun, and for this purpose broad-brmimed, dark felt hats for cold weather and straw or some other light-colored material for summer use are the best.

For the neck.—Nothing should be worn around the neck which would overheat the parts, dilate the blood vessels, and render the skin sensitive. The collars should be loose fitting, so as not to compress the blood vessels. The neck ought to be bared as much as possible and hardened by frequent ablutions with cold water.

For the body.—For undergarments, the union suits are the best. They should secure a normal amount of warmth and be so arranged as not to interfere with the free movements of the chest, or compress or displace the abdominal and pelvic organs. For these reasons, corsets and waistbands are wholly inadmissible. Suspenders should be worn by both sexes, or women may wear a bodice arranged for the attachment of skirts, so as to suspend their weight from the shoulders. Steel corset stays and tight lacing can not be too strongly condemned, because there is ample evidence that they have caused displacement and disease of the abdominal and pelvic organs.

The stockings should be made of some warm, permeable material, such as wool or merino, as the circulation is rather feeble in the lower extremities, and the feet are more liable to perspire. They should be long enough to reach above the knees and there fastened with some loosely-fitting band. Tight elastic bands and other constricting garters are liable to produce varicose veins.

The trousers must be sufficiently loose around the waist and elsewhere to permit of free circulation of blood.

FOOTWEAR.

Boots and shoes are intended to protect the feet from the uneven and rough surfaces of the ground, from cold, wet, and even heat, and must be constructed so as to meet these requirements. It is needless to insist that they should be patterned after the foot. The sole of a shoe should be so constructed that the great toe touches it in such a way that a line projected posteriorly through the middle of this toe will strike the middle of the heel. The heel should be broad and low, so as not to throw the weight on the toes. Across the tread and toes the sole should be sufficiently broad to permit of lateral expansion. The uppers should be soft and flexible, but not too roomy, and should fit

snugly around the ankles and insteps. Elastic gaiters are preferable to laced shoes.

It is perhaps needless to insist that cleanliness in body and clothing is next to godliness. This may be secured by frequent bathing and change of underwear. It is also a good plan to use nightshirts or pajamas, so as to afford an opportunity for a thorough airing of the underwear worn during the day. If in spite of the general cleanliness there should be indications of excessive sweating and disagreeable odors, especially of the feet, a physician should be consulted.

BED AND BEDDING.

Since about one-third of our life is spent in bed, something should be said of this article of comfort and necessity. As the object of the bed is to promote a refreshing sleep, it should be long and broad enough to permit of the necessary extension of the body; it should be elastic, so as not to compress the soft parts unnecessarily, and it should be warm, but not too warm. Metallic bedsteads are preferable to wood, because less liable to be infected with insects; they should be provided with a woven-wire mattress which admits of free circulation of air. Upon this may be placed a mattress of hair, felt, cotton, or excelsior, and pillows preferably made of horsehair. Feather pillows are too heating for the head, unless a layer of paper has been interposed, and high pillows are objectionable, as the position of the sleeper would impede the movement of the diaphragm. Sheets and pillowcases of cotton for winter and of linen for summer are necessary to prevent irritation of the skin and soiling of the mattress, pillows, and blankets.

The most suitable coverings for a bed are woolen blankets; they are warm and their permeability admits of the escape of gases. For warm weather a cotton quilt or comforter or even a linen sheet is preferable. The bedding should be aired every morning and exposed, whenever practicable, to sunlight, which is nature's purifier and destroys all forms of germs.

"Feather beds" and "down quilts" are warmer than blankets, as the air contained in the feathers is a bad conductor of heat, but they are only suitable in very cold climates, or for anæmic and delicate individuals, because they overheat the body, cause dilation of the cutaneous vessels, and consequently relax and impair the tone of the skin.

The sleeper should lie with his head slightly raised, preferably with the body inclined to the right side. He should rise rather slowly from the recumbent position, since a sudden change to the erect position not only accelerates the heart's action, but also changes the blood distribution too abruptly. The bed should be so placed that the occupant is not disturbed by the influence of light. A sound, refreshing sleep can only be had when the senses are no longer stimulated, and light is a stimulus which acts even through the closed eyelids.

SLEEP.

We are still in ignorance of the exact nature of sleep or the suspension of automatic activity of the brain. Some authors maintain

that it is due to an accumulation of waste products in the blood and central nervous system, and that it ceases with the elimination of these products. Others believe that sleep results from the exhaustion of the supply of intra-molecular oxygen, while still others attribute it to a temporary anæmia of the brain. On the whole, there is much reason for assuming that the refreshing effects of sleep are due to the elimination of waste products from the system and the absorption of a fresh store of oxygen. At all events, Pettenkoffer and Voit found that of the 954.5 grams of oxygen absorbed by a healthy adult in the course of twenty-four hours, 659.7 grams are absorbed between 6 o'clock in the evening and 6 o'clock in the morning.

AMOUNT OF SLEEP REQUIRED.

It is well known that healthy, new-born infants sleep all day, except while nursing. About the third or fourth week of their life they may remain awake for one-quarter of an hour, in addition to their nursing; in the seventh or eighth week they remain awake one-half hour, and in the fifth month about one hour; but even when a year old a child sleeps more than half of the twenty-four hours. During the second and third year it sleeps from ten to twelve hours at night and from two to two and one-half hours in the daytime. After the completion of the third year the necessity for sleep in daytime ceases.

Uffelmann has made a series of careful observations and believes that "healthy, well-cared-for children between 4 and 6 years of age require eleven hours of sleep; at 7 years of age, ten to ten and one-half hours of sleep; at 10 years of age, nine and one-half to ten hours of sleep; at 12 years of age, nine hours of sleep; at 14 years of age, eight and one-half hours of sleep; youths between 16 and 20, eight and one-half hours of sleep; adults, seven and one-half to eight hours of sleep; while the aged require a larger amount of sleep."

No hard and fast lines, however, can be drawn; some children and adults can get along with less, and others require more sleep. On the whole, we may conclude that the average adult requires about eight hours of sleep, and if the amount is materially lessened languor, pallor, nervous irritability, and general peevishness may be observed.

Excessive sleep is harmful, as it tends to produce sluggishness of the bodily functions, especially of the digestive organs. It lessens tissue metamorphosis and favors the deposition of fat—not to mention the bad effects of the prolonged presence in a polluted atmosphere.

We are also beginning to understand that the reason why an excess of sleep instead of being restful to intellectual energy is rather exhaustive is: After a certain amount of sleep, even though the body continues to be somnolent, the mind awakes and, in the midst of the undirected, rapidly varying mental excursions which follow, as much nerve force and mental energy is expended as would be necessary for the more continuous thinking of regular intellectual work.

Irregularity in sleep is always objectionable. The human body resents irregular habits of all kinds. Many infants sicken because of irregular nursing, and we all experience unpleasant symptoms when from any cause our regular meal hours are interrupted, and it is perfectly natural that such an important organ as the brain should demand regularity in action and rest.

Irregular bed hours are not calculated to promote a sound and refreshing sleep. Since we enjoy the best sleep before midnight, the hours between 10 o'clock p. m. and 6 a. m. or 11 p. m. to 7 a. m. are the most suitable.

Opinions differ as to the admissibility of a nap after dinner, and the question must be decided by individual circumstances. It is quite certain, however, that there is no physiological necessity for such a sleep in healthy children above the age of 4, nor for men and women in their best years, unless they have taken an inordinate amount of food. Persons in advanced age may profit by a short rest, which seems often demanded by an overwhelming drowsiness; the same may be said of delicate and anæmic individuals and those suffering from diseases of the digestive system.

DREAMS.

In spite of considerable research the occult character of dreams has not been entirely cleared up, although psychologists are agreed that they constitute a manifestation of intellectual life involving the expenditure of a certain amount of brain force or mental energy. Practical experience also teaches that a dreamless sleep is in every way recuperative, while a dreamful night produces a tired feeling in the morning; hence dreams should be avoided, if possible.

There is much reason for believing that the old custom of relating dreams, and the attempt to interpret them, has a bad effect on the minds of all, and especially of children, as it tends to bring about a similar mental rambling during sleep of subsequent nights. Attention has recently been called in an editorial (Journal A. M. A., July 28, 1907), to the fact that children suffer more frequently from night terrors, which are really overvivid dreams, on Sunday and Monday nights. This is partly attributed to the fact that the children have indulged in the "imagination-intoxicating" colored supplement to the Sunday newspaper with its horrors and its dream suggestions. Those of us who have been brought up in rural districts and have listened to dream tales and folklore and perused exciting literature have learned that all of this is productive of dreams and night terrors, and should be avoided.

IMPORTANCE OF GOOD TEETH.

When we recall the physiology of digestion it is scarcely necessary to point out the importance of a good set of teeth in order to secure thorough mastication and insalivation of the food. The temperature of food and drink exerts a special influence on our teeth. It has been shown that a sudden change from hot to cold in the mouth causes the enamel to crack, and leads to premature decay of the teeth, because the microbes in the mouth will find these fissures a suitable lurking place for their destructive work.

The teeth should never be used for the purpose of cracking nuts. Microbes of every description abound in the mouth, and find in the presence of lodged and decaying particles of food a suitable medium for their multiplication. In order to prevent their destructive effects, cleanliness of the mouth is absolutely essential. This can be secured by brushing the teeth with water and castile soap after each meal

and before retiring. In case particles of food can not be thus dislodged, a soft silk thread drawn between the teeth will accomplish the purpose more effectively and wisely than a toothpick. If the teeth are already painful, or show evidence of decay or of accumulation of tartar, a dentist should be consulted. It is a wise plan to have the teeth examined once a year, and as there are free dental infirmaries, the question of cost should not deter even the least resourceful people.

HABIT AND REGULARITY OF THE BOWELS.

As pointed out by Hammond,[6] when we perform an act under the operation of certain impressions, there is a tendency toward the performance of a similar act, if like influences are brought to bear upon the organism. "This disposition to repetition prevails in nearly every function of the body and mind until some powerful force intervenes." It is shown by the sensation of hunger and thirst which occur at customary meal hours, the desire to evacuate the bowels at the same hour of the day, the desire for sleep, the hour of awakening, and the inexpressible feeling excited by the want of a smoke or a customary stimulant.

CONSTIPATION.

When regularity of the bowels is established, the desire to go to the stool returns at the same hour. If this tendency is resisted, it is not long before constipation becomes the rule, with all its attending consequences of ill health. The most natural remedy to correct this morbid habit will be persistent effort to secure an evacuation every day at a fixed hour, aided by the use of succulent vegetables and fruits, and if necessary by small doses of olive oil, cotton-seed oil, or Epsom salts and water.

One of the most baneful effects of constipation is hypochondry—a nervous and mental condition brought about by absorption of poisonous products in the intestinal tract, and the continued action of the mind upon some one organ or function supposed to be disordered, notably the heart, liver, and stomach. The disease appears most commonly in irritable individuals and in those exhausted from a variety of causes. Such persons are of sound judgment in other respects, but reason erroneously on whatever concerns their own health. In these cases, apart from correcting the digestive derangements, it is often necessary to act upon the mind by keeping it occupied with matters which will divert the thoughts of the patient from himself. This is often readily accomplished on the golf links in persons who require exercise.

CARE OF THE EYES.

It is well known that exposure of the eyes to the direct rays of the sun may cause inflammation of the retina and even total blindness, and similar effects may be produced by the reflected rays of the sun from mirrors, sheets of water, white walls, and snow (snow blindness). On the other hand, defective lighting, as pointed out on page 88, also produces mischief, and must, therefore, be avoided in the

[6] Treatise on Hygiene, Wm. A. Hammond, 1863, p. 122.

home as well as in the shop. Sudden transposition from light to dark or dark to light is also injurious and may cause serious diseases of the eyes. Whenever there is any evidence of redness, inflammation, pain, watering, or "mattering" of the eyes, a physician should be consulted. While free bathing of the eyes with cold water may exert a preventive and tonic effect, the value of good eyesight is too great to trust to domestic remedies, or even to the services of an optician. Whenever there is any difficulty in reading, accompanied by pain or headache, an occulist should be chosen. When we recall the number of accidents which befall the eyes in many occupations, the importance of protective goggles must be apparent.

EAR AND NOSE.

These organs should be kept clean. There is danger from lodgment of foreign bodies, particularly in children, which may impair the hearing for life, especially when injudicious attempts at removal have been made. In such instances it is always best to consult a competent physician. The chief function of the nose evidently is to arrest more or less of the dust and germs upon its mucous surfaces, and in cold weather to warm the inspired air. Hence, the importance of cleanliness and of breathing through the nose instead of the mouth. In order to do this without discomfort, it is necessary that there be no obstruction in the nasal passages, and persons suffering from catarrh or other symptoms of difficult breathing will do well to undergo treatment. In this connection attention should be called to the advantages of so-called "deep breathing" in the open air or near an open window. This is best accomplished by taking 10 or 12 deep inspirations morning and evening, so as to inflate the lungs to their fullest expansive capacity. This practice is believed to secure a thorough ventilation of all the air vesicles and to increase the power of resistance to the invasion of the tubercle bacillus.

CHAPTER II.

ALIMENTATION AND FOODS.

The fact that proper nutrition of the body is important for the enjoyment of health has long since been recognized, and we all agree that the character of food not only influences the growth and development of the child, but also the health, power of endurance and resistance in the adult, and often plays a most important, if not decisive, rôle in the treatment of disease.

The human organism is made up of about 60 per cent of water, 19 per cent of protein compounds, 15 per cent of fats, and 6 per cent of mineral salts, all of which are sooner or later consumed, involving certain expenditures which must be covered if health and life are to be preserved.

The process by which the repair of waste is supplied is called alimentation or nutrition, and the entire process involved in the waste and repair of tissues is called metabolism. The simple chemical compounds which are appropriated by the system are called alimentary principles or nutrients, and the simple or artificial combinations of several nutrients are called nutriment or food.

The cause of the constant consumption of the proximate principals of the body must be looked for in the functional activity of the cells. We know that they take up, utilize, disintegrate, and eliminate matter; this gives rise to the generation of heat and the evolution of force or mechanical power, both of which are the result of latent energy contained in the substances introduced into the system as food.

The heat and vital force of the heart and other muscles of the body have their source clearly in the process of oxidation of carbon and oxygen, which primarily takes place in the cells; and all nutrients containing carbon and hydrogen contribute to the generation of heat and the evolution of muscular force.

The chief objects of food are, according to Atwater, to form the material of the body and repair its waste, and to yield heat to keep the body warm and muscular and other power for the work it has to do. The amount of energy contained in different foodstuffs has been measured in the laboratory by the amount of heat evolved during their combustion by means of an apparatus called the calorimeter. The unit commonly used is the calorie, by which we understand the amount of heat required to raise the temperature of a pound of water 1° F., or if transformed into mechanical power, such as the muscles use to do their work, a calorie represents force which would be sufficient to lift one ton 1.54 feet. Atwater gives the following general estimate for the average amount of heat and energy in one pound of each of the classes of nutrients:

	Calories.
1 pound of protein	1,860
1 pound of fat	4,220
1 pound of carbohydrates	1,860

Since the supply of foodstuff or income must be regulated by the consumption or outgo, it is essential that the consumption should be determined. Experiments of this kind are made in an apparatus called the "respiration calorimeter," and include not only a quantitative analysis of the food, drink, and air consumed by the man and of all the excretory products, which make up the income and outgo of the system, but also a careful estimate of the energy represented by ingested material, as well as the energy liberated from the body in the various excreta, in heat and mechanical energy.

The balance of income and expenditure is thus made, and the gain or loss of material of the body, with different kinds and amounts of food, and under different conditions of muscular exercise and rest, is determined. By means of these experiments Professor Atwater has been able to verify the law of the conservation of energy as applied to the animal organism, and has shown that every unit of energy which enters the body as potential energy of the food will leave the body in potential energy as excreta, in heat radiated from the body, or in mechanical work done by the muscular system. The material income of the body must balance the material outgo, and the energy income of the body must balance the energy outgo.

According to the classical experiments of Pettenkoffer and Voit, nearly forty years ago, the waste products of a healthy adult weighing 154 pounds, during twenty-four hours, at rest amounted to 16.8 grams of nitrogen in the urine, 275 grams of carbon, and 2,500 grams of water, while the waste products of the same individual, performing moderately hard muscular work, amounted to 18.8 grams of nitrogen,

328 of carbon, and 2,190 grams of water, and from these experiments the authors named concluded that the following quantities of nutrients are required during twenty-four hours:

	Protein.	Fats.	Carbohydrates.
	Grams.	Grams.	Grams.
Man without muscular work	118	45	450
Man with moderate muscular work	118	56	500
Man with hard muscular work	145	100	500

Professor Chittenden's experiments, conducted about three years ago, indicate that the nitrogen equilibrium is preserved on a daily intake of 8.5 to 9.5 grams of nitrogen, or about 55 grams of nitrogenous food, so that the protein ration of Voit may be cut in two, provided the fats and carbohydrates are introduced in sufficient quantities to bring the full value up to 2,500 or 2,600 calories. Other authorities, however, believe that it would be unwise to reduce the protein ration below 100 grams or 3.5 ounces a day.

One of the difficulties in the way of setting up exact standards is, as pointed out by Professor Atwater, that "different individuals of the same class differ widely in their demands for food and in the use they make of it. Two men of like age, size, build, and occupation may live and work side by side. One will eat more and the other less, while both do the same amount of work, or both may eat the same food and do the same work, and one will be fat and the other lean, or both may have the same diet and yet one will be strong and vigorous and able to do a great deal of work, while the other will be weak and able to accomplish but little. Just why individuals differ in their ways of utilizing their food and how to measure the differences and make dietary rules to fit them exactly, are problems which the physiological chemist has not yet solved."

There are also persons who, because of some peculiarity of the digestive system, can not use foods which for people in general are most wholesome and nutritious. Some persons can not eat eggs, others suffer if they take milk, others have to avoid certain kinds of meat or fruit and all these idiosyncracies indicate that the nutrition of man is not a mere matter of grams of protein, fats, and carbohydrates. In fact we live not upon what we eat, but upon what we digest and assimilate.

The whole subject of dietary standards is still in its infancy and the best we can do is to make estimates which apply to averages rather than individual cases. In a general way we may conclude that the needs of the economy are influenced (1) by the height and weight of the individual, amounting to a difference of 40 to 50 calories for each kilogram in body weight; (2) by the temperament—nervous and excitable persons require more food than those of a phlegmatic temperament; (3) by muscular activity, which involves not only an increased expenditure of carbon, but also increased consumption of protein; (4) age, in so far as during active growth there is also a more active metabolism and children consume more for each kilogram of their weight than adults; on the other hand, with advancing years tissue metamorphosis becomes less active; (5) sex influences the amount

of tissue consumption only in so far as there is a difference in weight and muscular activity; an exception should be noted in pregnant and nursing women, who doubtless should receive a more liberal supply of proteids; (6) by temperature and climate. The influence of low temperatures results in increased oxidation of carbon; hence an instinctive craving for more fatty food and the carbohydrates, sugar and starches, during the winter months and in cold climates. In the summer months and in warm climates there is a repugnance for fat and a craving for refreshing food and drinks, and hence the minimum amount of fat, about 40 grams, and between 300 to 400 grams of carbohydrates with a normal protein ration will meet the requirements.

Foodstuffs are classified according to their proximate composition as follows:

First. Organic, nitrogeneous, as proteids or albuminoids; non-nitrogenous (*a*) fats, (*b*) carbohydrates, (*c*) vegetable acids.

Second. Inorganic—mineral salts and water.

Third. Food accessories, as tea, coffee, and condiments.

The first two classes of foodstuff are essential to life; the third class is important as favoring palatability and digestibility.

The true nutrients are protein, fats, and carbohydrates.

The term "protein" includes most of the nitrogeneous food compounds, such as albuminoids, gelatinoids, and extractives.

1. The albuminoids include all substances allied in their chemical composition to egg albumin, and have an average composition of N 16 per cent, C 53 per cent, H 7 per cent, O 23 per cent, S 1 per cent. They are found in eggs, lean part of meat, milk, curds, and the gluten of wheat, the leguminous plants, etc. The principles of this group during digestion, with the exception of nuclein, are converted into soluble peptones or alkaline albuminates and readily absorbed as such; they are the chief tissue formers of the muscles and tendons of the body, but apart from this purely plastic function they also play a rôle in oxidation and therefore in the generation of heat and energy. At all events they can take the place of fats and carbohydrates if the body has not enough of one or the other for fuel, but neither of the latter can take the place of albuminoids in building and repairing tissue.

2. The gelatinoids resemble the albuminoid group in their chemical composition; they are derived from ossein and chondrin (connective tissue) and are changed to gelatin on heating with water and during digestion into gelatin-peptones. They are not tissue formers, but serve as fuel, and thus protect the protein fats and carbohydrates from consumption. Indeed 100 grams of gelatin can take the place of 36 grams of albumin and 25 grams of fat, but unfortunately large quantities are liable to cause nausea and diarrhea, probably because the undigested particles undergo rapid decomposition.

3. The extractives, so called because they are extracted from flesh by water, are known in the laboratory as creatin, creatinin, carnin, etc., and are the chief constituents of beef tea and meat extracts. Neither the extractives or amids found in vegetables like asparagus, betain, etc., can replace or exert a sparing effect on the consumption of albumin; they are therefore alimentary aids and not true foods.

Indeed Kemmerich, over twenty years ago, pointed out that they are not free from danger on account of the large percentage of potas-

sium salt; at all events, it has been shown that animals fed exclusively on meat extracts die more quickly from starvation than do those deprived entirely of food, and Fothergill, one of the most distinguished English food experts, expressed the opinion "that more lives have been lost by a mistaken belief in the food value of beef tea than by all the Napoleonic wars." Beef tea acts as a regulator and stimulant of digestion and assimilation and, like the meat broths, is useful in the dietary of sickness, provided we combine it with eggs, farinaceous food, and small quantities of gelatin. The meat peptones and fluid meat, containing, as they do, considerable proportions of true nutriments, are much to be preferred, but their nutritive value in the treatment of disease must not be overestimated.

4. The hydrocarbons of fats, whether derived from the animal or vegetable kingdom, are emulsified and saponified by the pancreatic juice and bile and finally reach the tissues, where they become an integral part of the cells. Apart from aiding in the reconstruction of fatty tissues, they undergo oxidation, and thus supply heat and energy. Since the cells without exception contain more or less fat, it being, in conjunction with albumin, the principal constituent of nerve tissue, a store of adipose tissue, especially during febrile conditions, hard work, or whenever the consumption exceeds the supply, is very desirable. If the supply of fat exceeds the demand, the excess is eliminated in the feces, while other portions are stored up in the visceral cavities and subcutaneous tissues, where it serves as a nonconductor of heat, gives beauty and form to the body, and protects various important structures from injury, but most important of all, if the supply should be cut off, or the consumption be increased, as during febrile conditions and hard work, this reserve fuel can be drawn upon for the production of heat and energy, and thus protect the more important protein compounds from oxidation.

5. The carbohydrates are nonnitrogenized principles which, in addition to carbon, contain hydrogen and oxygen in the proportion to form water. The formula for starch or dextrose is $C_6H_{10}O_5$ and that of sucrose or cane sugar $C_{12}H_{22}O_{11}$.

The carbohydrates, whatever their source, enter the blood as sugar; normal blood contains about 0.1 per cent and rarely more than 0.2 per cent of sugar. The liver prevents a large accumulation by storing it up as glycogen, or liver-starch, which under the influence of a peculiar ferment is reconverted into sugar as the needs of the economy demand, and any further excess is removed by the kidneys. The sugar in the blood is carried to the tissues, where it undergoes oxidation, yielding heat and energy. It is generally held that carbohydrates when ingested in liberal amounts may be converted into fat. How this is accomplished is not yet understood, but it may partly be accounted for by the fact that the oxidation of sugar saves the fatty and protein tissues from destruction and allows the fat in the diet to form new fatty tissues.

6. The pectin substances, like pectose and pectin, found in fruit and tubers, form jellies with water, are related to the carbohydrates, and probably serve similar purposes in the economy.

7. The organic acids, like tartaric, mallic, citric, acetic, oxalic, and lactic acids existing in fresh vegetables and fruits, fresh meats and milk, are transformed in the system into carbonates and as such preserve the alkalinity of the blood and other fluids. In the absence of

these acids the blood becomes impoverished and scurvy is liable to develop. An excess is likely to interfere with digestion, especially with the conversion of starch into sugar, not to mention the laxative and diuretic properties.

8. The fact that 60 per cent of the body is composed of water clearly indicates that a sufficient amount must be introduced to make up the loss sustained by its excretion through the lungs, kidneys, skin, and feces. It is simply necessary to recall the physiological functions of water in the absorption and assimilation of food, the elimination of waste products, and its rôle as a heat regulator to appreciate that a deficiency is certain to be followed by injurious effects.

9. The mineral salts, which furnish about 6 per cent of the body weight, are potassium, calcium, magnesium, sodium, and iron in combination with chlorine, phosphoric, sulphuric, and carbonic acid. The phosphates of lime, potash, and magnesia contribute largely to the formation of bone, and are also essential for the growth of the nervous system. Iron is required for the red blood corpuscles and coloring matters, the chlorides are the source of hydrochloric acid in the gastric juice and keep the globulins of the blood and other fluids of the body in solution. Potassium for the blood cells and solid tisues and sodium for the intercellular fluids are all essential for the growth and repair of the tissues; of these certain quantities are daily eliminated and must be replaced. Forster has shown that when the supply in animals is suspended, serious digestive derangements, depressions of the nervous system, muscular weakness, trembling, paralysis, stupor, and death ensue.

Voit's experiments indicate that an insufficient supply of the salts of lime produced rickets in growing animals, and children fed largely upon farinaceous food are proverbially prone to this affection; incomplete absorption of these salts produces the same effect, as shown by the frequent development of rickets after prolonged diarrheal affections.

An insufficient supply of iron or incomplete absorption may give rise to chlorosis and anæmia, and a deficiency of the potassium salts in consequence of an exclusive animal diet is believed to favor the development of scurvy, but as this disease has developed among prisoners who subsisted largely on a vegetable diet, I quite agree with Fluegge that the absence of fresh vegetables, more especially the organic acids contained therein, is the most important factor in the development of scurvy. An excess of chloride of sodium, as during a constant salt meat diet, doubtless predisposes to scurvy, probably because the chloride of sodium exerts a decomposing effect on the potassium combinations of the blood corpuscles.

The question as to the exact requirements of the inorganic salts in the system has not yet been solved. According to Boussingault an adult requires from 60 to 90 mgrs. of iron daily, and according to König, persons upon a mixed diet require from 12 to 20 grams of sodium chloride.

In reference to accessory foods, such as spices and condiments, extractives of meat, bitter principles contained in vegetables, tonics, and the alkaloidal beverages like coffee, tea, and cocoa, we can not stop to point out their physiological effects, except to say that, since they act largely through the nervous system, every excess over and above the amount required will produce mischief; indeed we may

safely conclude that, while the use of accessory foods in moderation increases temporarily the elasticity of mind and body and a desire and capacity for work, their abuse is fraught with danger.

FOOD.

The two broad divisions of food are animal and vegetable, although the mineral kingdom unites to furnish man with sustenance. Animal food is characterized by a predominance of the proteids and mineral salts, while vegetable food is rich in carbohydrates, which, however, like the vegetable albumin, are inclosed in cells composed of a fibrous frame-work known as cellulose, and therefore more difficult to be acted upon by the digestive fluids.

An excess of this cellulose usually excites undue peristaltic action and consequently a more rapid transit of the intestinal contents, and thus interferes with the complete utilization of the nutritive material; a certain amount of cellulose is necessary, however, to promote the action, because if the food was so nutritious as to be entirely absorbed, there would be very little solid to transmit and the action of the bowels would become irregular and unsatisfactory. Hence the good effect of graham bread, vegetables, and fruit in habitual constipation.

ANIMAL FOOD.

MEAT.

In a dietetic point of view we mean by meat the muscular substance with its connective tissues, the fat and various juices deposited therein.

The nutritive value of meat depends upon the large percentage of protein. Dark meats, such as game and wild fowl and beef, contain from 18 to 25 per cent of albumin.

The relative amount of nutritive matter is shown in the following table based upon analyses by König, Voit, and others:

	Proteids.	Gelatin.	Fat.	Salts.	Extractives.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Beef	18.4	1.6	0.9	1.3	1.9
Veal	16.3	4.6	1.0	1.0	.9
Mutton	17.5	.....	1.5	1.2	1.4
Pork, fresh, lean	15.5	1.5	3.5	1.2	1.3
Ham, medium fat	15.3	.....	28.9	8	.....
Ham, smoked, lean	19.8	.....	20.3	6.5	.....
Horse	21.7	.....	2.5	1.0	.....
Game (rabbit)	23.3	.....	1.1	1.1	.....
Broiler chicken	21.5	.....	2.5	.....	.....
Fowls	19.3	.....	16.3	1.0	.....
Turkey	21.1	.....	22.9	1.0	.....

According to the foregoing table, game and fowl are richest in proteids, salts and extractives; veal and pork are poorest in proteids; veal richest in gelatin; ham and pork richest in fat; horse and veal poorest in fat; beef richest in extractives; veal poorest in extractives.

All of which explains the superior nutritive value of game and wild fowl, in the so-called dark meats and also the superior flavor of beef and fowl over veal and pork, and also explains the rich amount of gelatin in veal broth and gravies.

The particular part from which the meat is derived also influences the percentage of proteids, as shown by König:

Per cent of proteids in beef from—	
A shoulder piece	14.50
The loins	18.80
The neck	19.50
The hind quarter	20.81

The meat of young animals, on account of the excess of water, contains less nutriment, but because of the more delicate connective tissue is more readily digested.

FISH.

The meat of fish contains about the same foodstuffs, only in smaller proportions, due to the excess of water. Most of the fish meat contains from 15 to 20 per cent of proteids, but oysters, crabs, and lobsters contain only from 5 to 10 per cent. There is little or no difference in the digestibility of white and dark meats, as from 95 to 96 per cent are utilized. Fish meat, contrary to popular opinion, contains less phosphates than that of other animals.

	Proteids.	Fats.	Salts.	Carbohydrates.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Oysters	9.78	2.05	1.98	5.89
Canned oysters	7.41	2.07	2.15	3.95
Clams	14.55	1.79	2.76	2.94
Mussels	12.51	1.67	1.73	5.42
Lobsters	14.49	1.84	1.71	.....
Crab	16.64	1.96	3.13	.....
Shrimps, canned	25.88	1.00	2.58	.....
Terrapin	21.23	3.47	1.02	.....
Green turtle	19.84	.53	1.20	.....

According to J. König and the United States Commissioner of Fisheries the composition of fish meat is as follows:

	Proteids.	Fats.	Salts.
	Per cent.	*Per cent.*	*Per cent.*
Haddock	16.71	0.20	1.44
Pike	18.34	.51	.93
Carp	21.86	1.09	1.33
Herring	10.11	7.11	2.07
Eel	12.83	28.37	.81
Salmon	15.01	6.42	1.36
Shad	18.55	9.48	1.35
Spanish mackerel	20.97	9.43	1.50
Mackerel	18.77	8.21	1.40
Lake trout	18.22	11.38	1.24
Brook trout	18.97	2.10	1.21
Halibut	18.35	5.18	1.05
Black bass	21.05	2.44	1.24
Red bass	16.66	.53	1.23
White perch	19.03	4.07	1.19
Yellow perch	18.49	.70	1.29
Red snapper	19.20	1.08	1.31
Sturgeon	17.96	1.90	1.43
Smelt	17.36	1.80	1.68
Codfish meal	74.46	1.00	6.41
Smoked haddock	83.66	.17	1.53
Smoked herring	36.44	15.82	2.06

The consumption of raw meats should be discouraged on account of the danger of transmission of animal parasites which are only destroyed by a temperature of 160° F.

In roasting meat, certain chemical changes take place which not only improve the taste but its digestibility, largely because the con-

nective tissue is converted into gelatin and the liberated muscular fibers are more readily acted upon by the digestive fluids.

Broiling produces very much the same changes, except perhaps a more complete retention of the juices, extractives, and salts. Fried meats are usually objectionable, unless they have been dropped into very hot fat, in which case coagulation of the albumin not only prevents excessive absorption of fat, but also the exudations of flavor and juices.

BOILED MEATS AND BROTHS.

Boiling water coagulates the albumin, transforms the connective tissue into gelatin, and dissipates the coloring matter, but as the water penetrates, it abstracts some of the newly formed gelatin, extractives, and salts; also some of the fats and proteids. The loss thus sustained depends upon whether the meat has been placed in boiling or cold water. If we wish to retain the juices and flavor in the meat, it should be plunged in boiling water, as the rapid coagulation of the albumin will prevent excessive exudation. If, on the other hand, we desire a rich broth, the meat should be placed in cold water and kept at a temperature below 160°. The loss sustained in extractives, salts, and water renders boiled meat less palatable and also somewhat tougher unless cooked at a temperature below 180°, and it is therefore not so easily digested; the nutritive value of boiled meat, however, is not impaired and the objections referred to can be overcome by chopping and the addition of spices.

In stewing, the meat should be cut into small pieces, placed in cold water, and brought up gradually to a temperature of 180 degrees, and kept there for several hours.

Gravies, on account of the large amount of fat and gelatin present, are liable to cause indigestion in feeble stomachs and are not suitable for the sick and invalids.

The meat peptones and meat juices, because of the presence of proteids, are doubtless of value in the treatment of disease.

SPECIAL CONCENTRATED MEAT PRODUCTS.

Meat powder or meat flour is made of lean beef, cut into strips and dipped into very hot fat. After draining, it is dried slowly in an oven and ground into very fine powder, 1 pound representing about 4 pounds of flesh. The nutritive value of these products is very high. Carne pura contains 68 per cent of protein, and codfish meal 79 per cent. Their digestibility is also very good, they keep well, and the price is moderate, but on account of their taste and odor they have not come into general use. Meat powder has been mixed with meal from the legumes, wheat flour, and other farinaceous food in the form of biscuits or compressed cakes for use as an army emergency ration. The nutritive value of ham, bacon, sausage, and other meat products is also very high.

Meat may be preserved by cold storage, by heat as in the canning process, by drying as in the case of jerked beef or venison, by smoking and pickling either in brine or vinegar. Chemical preservatives other than salt or vinegar should not be tolerated, as we possess in cold storage and heat far more efficient and certainly less harmful preservatives.

MEAT INSPECTION.

In judging the quality and wholesomeness of meat, the color, consistency, and odor are valuable points to be observed. Good beef has a bright red color and marbled appearance due to the presence of fat; it is firm yet elastic to the touch, moderately moist, and has a characteristic beefy odor. Bull beef is usually of a darker color; mutton has more of a brownish red color; meat of immature animals is pale, watery, and friable. Meat which has gone beyond the first stage of decomposition is soft and liable to pit or crackle upon pressure, and emits an offensive tainted odor, especially when hot water is poured upon it. In pushing a knife to the hilt, the resistance in good meat is uniform, while in putrefying meat some parts are softer than others and the tainted odor clings to the knife. In temperate climates the marrow remains solid for twenty-four hours and is of a light pink color; when it is soft, looks brownish, and contains black points the animal has either been sick or putrefactive changes have begun.

In connection with meat products the possibility of ptomaine poisoning, with symptoms of nauseau, vomiting, diarrhea, cramps, and depression should not be overlooked. Similar symptoms have been observed after the eating of oysters, mussels, crabs, lobsters, and milk. Oysters raised in sewage-polluted beds have been known to transmit the germs of typhoid fever. Diseases like anthrax, bovine tuberculosis, hydrophobia, foot-and-mouth disease, infectious enteritis, actinomyces, trichina, and cystererci are transmissible to man through the meat supply. For all these reasons hygiene demands not only a proper control of the meat market, but also proper cooking, since nothing short of a temperature of 160° will destroy these organisms.

MILK.

Milk is an ideal food. The average composition of cow's milk is protein, 4.5; fat, 3; sugar, 4.5; salts, 0.75; water, 87.25.

In keeping milk at ordinary temperature it rapidly undergoes changes which are brought about by the agency of micro-organisms. One of the greatest dangers in milk is caused by impurities seen in the so-called milk sediments, which consist largely of excrementitious matter clinging to the teats and udder of the animal, and which, owing to the presence of fecal bacteria, bring about rapid souring of the milk, with the production of toxins such as tyrotoxicon, and these in turn give rise to cholera infantum and other gastro-enteric diseases.

The reaction of milk should be neutral or amphoteric, the amount of cream should not be less than 10 per cent per volume, and the amount of total solids not less than 12 per cent, of which at least 3 per cent should be butter fat. Milk is not quite as digestible as meat; nevertheless, from 89 to 92 per cent is utilized. Boiled milk is not as digestible as raw or pasteurized milk. (See also milk as a cause of disease, p. 193.

Skimmed milk is the residue after the cream has been removed. As it contains the other solids and is quite cheap, it should become a more popular article of food. The same may be said of cottage cheese.

There are a number of brands of condensed milk in the market, all made by the evaporation of the water of the milk by moderate heat or

in vacuum pans with or without the addition of sugar. In the plain variety the milk is condensed to about one-third or one-fourth of its volume. As at present prepared, condensed milk is unsuitable for infant feeding, because it contains an excess of the proteids and sugar and is deficient in fats. These objections can be removed by modifying the milk previous to condensation, so that the composition is as nearly as possible that of human milk. It then can be condensed to about one-third of its original volume and the proportions restored by proper dilution just before using it for infant feeding.

Whey is the serum or watery part of the milk which remains after the curds have been pressed out from the milk to make cheese. It is used in certain diseases and also as a food in very difficult cases of indigestion in infant feeding.

Milk wines, like koumis and kefyr, are made from mares' or cows' milk, respectively, and are the products of a peculiar fermentation, combining alcoholic with lactic acid fermentations. These beverages, in addition to the normal constituents of milk, contain alcohol, carbonic acid, and lactic acid, and are of value in the feeding of invalids.

Buttermilk contains all of the constituents of milk except that the amount of fat and sugar is less. The presence of lactic acid imparts a pleasant taste, and as it contains most of the desirable nutrients and is, moreover, quite cheap, its use should be encouraged.

CHEESE.

Cheese varies in richness according to the amount of cream used in its manufacture. Cheeses contain from 26 to 40 per cent of fat and 17 to 29 per cent of protein, and possess, therefore, remarkable nutritive qualities. If taken in reasonable quantities, 96 per cent of the protein and 97 per cent of the fat is digested. Cheese should never be taken in the form of toasted cheese. The richer cheeses, unless eaten quite sparingly, are very apt to produce dyspepsia.

BUTTER AND BUTTER SUBSTITUTES.

Bûtter is formed by churning the cream of milk. The amount of butter in cows' milk is about 3.75 or 4 per cent (i. e., about 4 pounds to the 100 pounds of milk). Butter contains about 84 per cent of fat, of which nearly 97 per cent is digested if taken in moderate quantities. Rancid butter is very liable to cause indigestion.

Process or renovated butter is the product of rancid or tainted butter which has been purified by melting and washing, and, since it is sold far below the market value of butter and possesses the same nutritive properties as fresh butter, its use should not be scorned.

Oleomargarine is a mixture of oleo oil derived from the richest and choicest fat of the beef, neutral lard, butter, cream, or milk and salt, and in the cheaper grades cotton-seed oil is also used. Oleo and neutral lard are the chief ingredients. These, after melting, are churned with cream or milk, salted, and run through cold water, worked in a butter worker, and placed in suitable packages and labeled, according to the United States laws, "Oleomargarine." If colored to resemble June butter it is subject to a special tax of 10 cents per pound. If sold uncolored the revenue tax is only one-fourth cent per pound. There is practically no difference in the nutritive value

and the digestibility between butter and oleomargarine or butterine, and, as it is sold for half the cost of butter, the writer, as a teacher of hygiene, has urged upon his students for years to bring the nutritive value of this foodstuff to the attention of the public and, in the interest of the wage-earners, to correct, as far as possible, the prejudice which has been created against its use, provided, of course, it is sold under its true name and at its real value.

EGGS.

Egg albumin has the following composition: Albumin 13 per cent, fat 0.2 per cent, salts 0.6 per cent, water 86 per cent; yolk, vitellin 15.8 per cent, lecithin 8.7 per cent, nuclein 1.5 per cent, fat 20.3 per cent, salts 1 per cent, water 51.8 per cent. Eggs, raw or soft boiled or when stirred into hot soups, are readily digested; about 97 per cent of the proteids and 95 per cent of the fats are utilized. Hard-boiled eggs are not readily digested, and for people with feeble digestion the yolk of the egg stirred in soup should be preferred. The nutritive value of a single egg is equal to 37 grams of fat beef or 165 c. cm. of rich milk. Fish eggs contain, on the whole, the same nutritive principles as chicken eggs, only in different proportions.

VEGETABLE FOOD.

CEREALS.

Of all the vegetables the cereals stand at the head of the list. While the legumes contain more vegetable albumin, they can not be prepared in so many suitable ways, and are more difficult of digestion.

H. W. Wiley's analysis, based upon American grains, is as follows:

	Moisture.	Proteids.	Fat and ether extracts.	Starch.	Cellulose.	Salts.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Wheat	10.60	12.25	1.75	71.25	2.40	1.75
Rye	10.50	12.25	1.50	71.75	2.10	1.90
Barley	10.85	11.00	2.25	69.55	3.85	2.50
Oats	10.00	12.00	4.50	58.00	12.00	3.50
Indian corn	10.75	10.00	4.25	71.75	1.75	1.50
Buckwheat	12.00	10.75	2.00	62.75	10.75	1.75
Rice, polished	12.40	7.50	.40	78.80	.40	.50

The following table (Uffelmann's) shows the average composition of different flours and cereals:

	Protein.	Carbohydrates.	Cellulose.
	Per cent.	*Per cent.*	*Per cent.*
Fine wheat flour	11.00	74.90	.....
Fine rye flour	10.20	75.10	.....
Fine cracked wheat	10.43	75.95	0.22
Fine cracked barley	10.89	71.85	.47
Pealed barley	11.25	70.64	.54
Oatmeal	14.29	65.78	2.24
Cornmeal	10.00	71.00	2.50
Buckwheat meal	10.71	70.12	1.04
Rice	7.80	79.40	.....

The cereals are eaten only after a series of careful manipulations producing different grades of flour, varieties of breakfast cereals, etc. In the finest grades of flour nearly all the outer membranes of the wheat grain (bran) is separated; while this removes much indigestible matter it also removes some of the proteids and fats. On the other hand the nutritive material in bran is in a form quite difficult of digestion, and the experiments conducted by Professor Snyder in 1901 indicated that the available proteids in graham bread are not utilized to the same extent as in high-grade white bread.

Wheat and rye flour, on account of the gluten present, are especially suited for the preparation of bread; preference should be given to properly baked yeast bread, and next to the patent aerated bread, while the use of baking powders should be discouraged. Apart from the fact that yeast predigests in a degree the starchy matter, baking powders are often subject to shameful adulterations. Bread possesses decided nutritive qualities, the proportion of nitrogenous to non-nitrogenous matter being 1 in 7. Experience has shown that a male adult can not digest over 750 grams, and a female over 600 grams a day. This amount would supply about two-fifths of the protein and two-thirds of the carbohydrates required in twenty-four hours. When taken in proper quantities 95 to 96 per cent of a light, spongy bread are digested. Toasted bread contains less water and hence more nutriment pound for pound. Crackers can not take the place of bread. Gluten crackers are suitable for diabetic subjects, because they contain from 55 to 75 per cent of protein and only from 10 to 30 per cent of starch.

The nutritive value of vermicelli, macaroni, and the various grits used in soups and in the preparation of mushes may be materially enhanced by the addition of milk and cream.

Legumes are a most valuable class of foodstuff, on account of the great amount of vegetable albumin present, and have very aptly been called the poor man's meat. The difference in nutritive value between the immature peas and beans, which are used as green vegetables, and the matured seeds is shown by the analysis of König, Atwater, and Bryant:

	Proteids.	Fat.	Starch and dextrin.	Carbohydrates.	Cellulose.	Salts.
	Per cent.	*Per cent.*	*Per cent*	*Per cent.*	*Per cent*	*Per cent.*
Soja beans	33.41	17.19	29 99	.....	4.71	5.19
Broad beans	21 27	1.61	49 01	.....	7.09	3.26
Kidney beans	23.21	2.14	53.67	.....	3.09	3.55
Peas	22.85	1.79	52 46	.....	5.43	2.58
Lentils	25.70	1.89	53 46	.....	3.57	3.04
Green peas (Atwater and Bryant)	7.00	.50	.....	16 90	.....	1.00
Canned peas (Atwater and Bryant)	3.00	.20	.....	9.80	.....	1.10
String beans:						
Fresh	2.80	.80	.....	7 40	.....	.80
Canned	1.10	.10	.....	3.80	.....	1.80

The digestibility of these vegetables depends largely upon the mode of cooking; they should not be cooked in hard water, as the lime salts form insoluble compounds with the legumin, and after cooking the outer membrane should be removed by straining, in which case about 88 per cent of the nutritives are utilized. If they are old they should first be soaked for twenty-four hours in cold water.

SUCCULENT VEGETABLES.

Almost all of the fresh vegetables, except potatoes and green peas, contain a great amount of water, cellulose, and salts, and therefore very little nutriment. They are rich in amido-compounds, and their chief value consists in the fact that they supply the mineral salts in a very palatable and assimilable form.

Potatoes contain proteids 2 per cent, fat 0.10 per cent, starch 20 per cent. The juice is a valuable antiscorbutic. If over 600 grams of potatoes are taken daily some of the starch is liable to undergo fermentation. In sprouting solanin, a toxic agent, is produced; this is liable to cause nausea, vomiting, and diarrhea. The nutritive value of potatoes can be improved by cooking them in their jackets and the addition of butter and milk; fried potatoes, except in the form of Saratoga chips, can not be recommended.

String beans and green peas possess greater nutritive value than potatoes, carrots, beets, oyster plant, parsnips, radishes, turnips, pumpkins, celery, lettuce, squash, asparagus, tomatoes, and cucumbers on account of the greater amount of vegetable albumin present. With the exception of beans and peas most of the vegetables are deficient in proteids but fairly rich in carbohydrates and are chiefly valuable for their salts and for the variety which they give to our food.

The different varieties of cabbage and spinach are antiscorbutic agents, while lettuce and endive owe their refreshing taste to the presence of organic acids in the form of citrates, malates, and oxalates. The efficacy of onions, wild artichoke, sorrel, scurvy grass, mustard, cress, and lambs' quarters as antiscorbutics should not be forgotten. The nutritive value of edible mushrooms is not greater than that of other fresh vegetables; they are not easily digested and have been greatly overrated as an article of diet.

FRUITS.

Fruits, apart from vegetable fiber and juice, contain some soluble proteids, sugar, dextrose, lavulose, pectins, free organic acids (citric, malic, and tartaric), and compounds of these with potassium, sodium, and lime. The quantitative composition of some of the fresh fruits, according to König, is as follows:

	Proteids.	Free acids.	Sugar and pectin.	Cellulose.	Salts.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Grapes	0.59	0.79	26.32	3.60	0.58
Cherries	.67	.91	12.00	6.07	.73
Peaches	.65	.92	11.65	6.06	.69
Pears	.36	.20	11.90	4.30	.31
Apples	.36	.82	13.03	1.51	.49
Apricots	.49	1.16	11.04	5.2[illegible]	.82
Plums	.78	.85	11.07	5.41	.71
Currants	.51	2.15	7.28	4.57	.72
Strawberries	.54	.93	7.74	2.32	.81
Oranges	.73	2.44	5.54	1.79	.49
Blackberries	.51	1.19	4.44	6.97	.48
Raspberries	.40	1.42	3.86	8.10	.48
Cranberries	.12	2.34	1.53	6.27	.15
Huckleberries	.73	1.66	5.02	13.16	1.02
Dried grapes	2.42	.....	62.00	.....	1.21
Dried apples	1.28	3.60	59.77	4.99	1.57
Dried pears	2.07	.84	58.80	6.86	1.67
Dried plums	2.25	2.75	62.32	1.52	1.87

Watermelons contain 92 per cent of water, 0.4 per cent of protein, 0.2 per cent fat, 6.7 per cent of carbohydrates and fiber, and 0.3 per cent of salts. There is nothing in their nutritive qualities to justify their popularity. Ripe bananas contain 20 per cent of sugar, 2 per cent of protein, 0.5 per cent of starch, and a little more of fat. Fresh figs are about equal in nutritive value to the banana. The dried fig contains 50 per cent of sugar, 4 per cent of protein, 3 per cent of salts, and about 13 per cent of seeds and indigestible fiber.

Fruit contains very little protein, but the percentage of carbohydrates is considerable, and on account of the organic salts and aromatics they are very refreshing and promote the action of the bowels and kidneys. Hard and very acid fruits are liable to produce diarrhea. Lemon and lime juice contain free organic acids, about 30 grains of citric acid to 1 ounce of the juice, and are excellent antiscorbutic agents.

Shell fruits contain a great amount of nutritive material in the form of protein, fat, and carbohydrates, as shown by the following table prepared by Uffelmann:

	Protein.	Fat.	Carbohydrate.	Cellulose.	Salts.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Almonds	24.18	58.68	7.22	6.54	2.98
Walnuts	16.37	62.86	7.89	6.17	2.08
Chestnuts	5.48	1.37	38.34	1.61	1.72
Bread fruit	3.99	1.69	67.67	6.19	1.69

Hazelnuts have about the same composition as walnuts. The meat of cocoanuts contains about 70 per cent of fat and the milk contains nearly 7 per cent of sugar. Peanuts contain about 30 per cent of protein and 45 per cent of fat, and hence enjoy a very deserved reputation. Chestnuts are quite indigestible in the raw state, and should be either roasted or cooked. Roasting also aids in the digestion of peanuts and almonds.

Honey, sugar, and sirups are foodstuffs, as they supply heat and energy in the system and also improve the palatability of the food. The same is true of jams and jellies; the latter delicacies should always be homemade, as it is frequently the case that they are made from glucose, sirups, and gelatin artificially colored and flavored. Indeed it has been shown that the refuse of fruit-canning establishments and such tasteless articles as summer squash, boiled white turnips, and clover seed are transformed into commercial jams.

COMBINATION OF FOOD.

A question of considerable importance is whether the needs of the economy shall be supplied with an animal, vegetable, or mixed diet, and the answer is plainly in favor of a mixed course. In the first place, the structures of our teeth and digestive tract plainly indicate that we occupy an intermediate position between the carnivora and herbivora. In the second place, if we were to supply the needs of protein in the system exclusively from the vegetable kingdom, we would have to introduce an excess of carbohydrates, i. e., about 1,800 grams of bread or rice or 6,000 grams of potatoes. On the other hand, in order to supply the requirements of carbon from the animal kingdom, we would have to eat about 7,000 grams of meat containing

5 per cent of fat or drink 6,000 grams of milk. Such quantities can not be taken for any length of time without creating intense disgust for food and causing serious systemic disorders. For these reasons alone a mixed diet should be preferred. Moreover, Uffelmann has shown that the recruits of a Prussian infantry company, between the ages of 21 and 22 years, made their best gains while subsisting on 39 grams of animal and 71 grams of vegetable proteids, and concludes that this proportion is, physiologically speaking, the proper one. Indeed an exclusive animal diet is liable to produce gout and diseases of the arteries, kidneys, and liver, and health suffers whenever 75 per cent or more of the proteids are supplied in the form of meat or eggs, probably on account of the crystalline waste products in the blood.

Food should be combined so as not to tax the digestive organs. Thus, for example, milk is not well borne with acid fruits, and the digestibility of eggs is impaired by large quantities of fluids. The condiments and relishes should not be wanting, and monotony in diet should be avoided. The foundation of a suitable diet will, however, be found in meat, milk, butter or fat, bread, rice, or potatoes.

The amount of cooked meat should not be less than 160 grams and should not exceed 190 grams a day, or from 180 to 210 grams of fish. If the minimum amounts are taken, the deficiency should be supplied by 250 c. cm. of milk.

The daily requirements of fat are at least 25 grams of butter, oleomargarine or lard, or 30 grams of bacon, according to the taste and circumstances of the individual.

Bread is an indispensable article of diet, and has long been called the staff of life; it furnishes a well-balanced ration of protein and hydrocarbons, but experience has shown that more than 750 grams per day can not be tolerated, nor can more than 600 grams of potatoes be profitably consumed per day. It is very desirable that legumes and rice should take the place of some of the potatoes.

From our knowledge of the proximate constituents contained in the various foodstuffs, diet tables can be constructed which will meet the requirements of the body as well as the purse of the consumer. So, for example, a ration of bread, codfish, lard, bacon, potatoes, beans, milk, sugar, and tea may be purchased for 15 to 20 cents which in actual food value is equal to the best hotel fare.

STOREROOMS AND PANTRIES.

The different methods employed in food preservation—such as cold storage, drying, salting, pickling, and canning—have been briefly referred to, and it remains to point out what may be done for the preservation of food of a perishable nature. When we realize that all fermentative and putrefactive processes are initiated by micro-organisms, we will appreciate the importance of absolute cleanliness and the creation of such environments as will preclude at least their rapid proliferation. For this purpose the food should be kept in dry, well-ventilated, and cool storerooms or pantries, located preferably in the basement, and away from contaminating influences, such as impure air, dust, and other sources of infection. In summer the use of ice boxes or cold storage is quite essential to inhibit bacterial development, and food should be purchased in such quantities as to insure speedy consumption. It is perhaps unnecessary to say that food

should never be kept in, or in close proximity to, living and sleeping rooms or soiled linen closets, and yet this is not infrequently the case.

In order to prevent infection of the food by means of flies, the storeroom should be properly screened, and it is also a good plan to use either filtered or boiled water for washing fruits and vegetables which are eaten raw. Persons suffering or recovering from communicable diseases should not be permitted to handle food for others. Food should never be placed in dirty pans or dishes, and great care should be exercised to prevent metallic contamination. For example, old milk pans may impart zinc, utensils made of tin, lead, or copper may contaminate fruit, lead or tinfoil may contaminate cheese; arsenical pigments have been known to contaminate the bread in green-painted bread boxes, or confectionery wrapped in colored papers.

PREPARATION OF FOOD FOR COOKING, ETC.

Prior to cooking, all raw materials should be thoroughly cleaned by soaking, rubbing, rinsing, and wiping. This will render the food not only more appetizing, but also more wholesome, by the removal of adherent particles of dirt and micro-organisms. The same may be said of the removal of decayed or indigestible portions—such as the husks of legumes, the peelings of fruits, potatoes, and other vegetables—and the removal of tendons and fasciæ from meat. Chopping, grinding, and pounding render meat and other articles more tender and accessible to the action of the digestive fluids. The addition of condiments improves the taste and digestibility, provided the food is not too highly seasoned. A high temperature secured by boiling, steaming, roasting, or baking not only influences the consistency, taste, flavor, chemical constitution, digestibility, and keeping qualities of food, but also destroys all parasites and micro-organisms which may be present.

COOKING AND EATING UTENSILS.

Hygiene demands that all such utensils must be kept scrupulously clean; apart from the hygienic and esthetic aspect, food served in clean and attractive dishes tastes better and stimulates the appetite and digestion.

We have learned that, long before we knew of the existence of saprophytic germs and ptomaine intoxications, the Hebrews paid special attention to the subject of clean cooking, eating, and drinking utensils. We know from daily observation that unclean methods are a fruitful cause of disease. (Industrial Hygiene, p. 111.)

The shape of cooking utensils is of importance in the question of cleanliness; for this reason a flat bottom, with a quarter-round termination of the sides, should be chosen. Earthenware pots and pans glazed with lead, or iron pots enameled with lead or zinc containing lead, should not be used. Britannia ware occasionally contains lead and should be tested. Utensils made of nickel impart a peculiar bitter taste to the food and drink, but are not otherwise objectionable. Copper and brass utensils must be kept polished to prevent the formation of copper salts. Food containing fat, chloride of sodium, and ammonia compounds should not be permitted to cool in copper utensils, as the copper oxidizes at the level of the food and becomes soluble. Iron utensils impart a peculiar inky taste and grayish appear-

ance to food, and should therefore be tinned or enameled. For all these reasons porcelain lined or granite ware and the various steam-cooking utensils should be preferred.

The temperature of food and drink is not a matter of indifference; this is especially seen in the artificial feeding of infants. Iced drinks hastily swallowed, are liable to cause neuralgia of the stomach, dyspepsia, and even acute gastric catarrh; cold grapes and fruit are apt to produce colic and diarrhea. The bad effects of cold victuals have been frequently observed in persons obliged to eat cold lunches, and may be regarded as a frequent cause of intemperance.

Apart from the bad effects of high and low temperature upon the teeth,[a] we know that cold injesta also impair the action of pepsin and ptyalin, which are most efficient at about the body temperature. Hot food or drinks, apart from injuring the mucous membranes of the mouth and stomach, also interfere with the action of pepsin and ptyalin, which is completely arrested at a temperature of 140° F. On the whole, we may conclude that the temperature of food and drink should be as nearly as possible that of the body heat, and this should be the rule for infants. A temperature of 45° may be regarded an extreme low and one of 120° an extreme high temperature for the introduction of food.

The consistency of food exerts considerable influence upon our digestive organs; coarse and tough substances are less susceptible to the action of the digestive fluids, and consequently more difficult of digestion; this is especially true of many fibrous vegetables, of hard-boiled eggs, and heavy, sodden bread. For infants, liquid food is the best form, but adults require a certain stimulus, not to be had in liquid food, and if taken for any length of time this is certain to disagree and create disgust. A semisolid food has also been objected to because of the excess of water, which is believed to lower the tone of the digestive organs. These objections have been urged by physicians on behalf of prisoners, who, on account of insufficient exercise, can not very well get rid of the excess of water. This same objection does not apply to persons actively employed, and for whom a semisolid food has indeed been found by experience the best suited to their wants.

VOLUME OF FOOD.

It is not sufficient to supply the required quantity of food, but it should also be introduced in such a volume as to satisfy the feeling of the individual and the capacity of the stomach.

From the results of experience and observation we may conclude that an adult of average weight and performing ordinary labor, in order to satisfy a feeling of contentment, requires from 1,600 to 2,000 grams (4 to 5 pounds of food) daily. Of this amount from 800 to 1,000 grams (2 to 2½ pounds) should be taken at dinner. These figures are simply suggestive, and as individual habits play an important rôle it will be well to guard against a sudden increase or diminution in the volume of food.

MEAL HOURS.

The daily allowance of food should be taken in divided meals. On account of the different habits and occupations it is difficult to formulate a rule for all classes. In a general way we may say that a

[a] Kober's Industrial Hygiene, p. 119.

healthy adult should eat at least three times and not oftener than five times a day. The most rational dinner hour for a man who begins his labors at 6 or 7 o'clock in the morning is between 12 and 1 o'clock, for he will then be in need of food, and if he defers his principal meal till evening he will be so tired that he can neither enjoy nor fully digest it. Such persons should eat a good breakfast, a full dinner about noon, and a supper between 5 and 6 o'clock. If their appetite for an early breakfast is poor, they should eat a light lunch about 9 o'clock a. m. and a similar lunch between 8 and 9 p. m. For persons not engaged in active muscular work it is desirable that they should eat a light breakfast, a hot lunch at noon, dinner at 5 o'clock, and some light lunch between 8 and 9 p. m.

Unfortunately, we possess as yet no reliable data, as regards the requirements of food for men who, while leading a sedentary life, perform a great amount of brain work. Some authorities claim that mental, like physical, labor increases the amount of carbon consumption, but not of nitrogen. Others insist that since the brain and nerve tissues contain the elements of nitrogen and phosphorus which occur in the protein compounds, they should be especially concerned in building up brain and nerves and keeping them in repair. The general impression, however, is that people whose work is mental rather than physical eat too much, especially fat and carbohydrates, and that the ordinary subsistence diet composed of 100 grams of protein, 56 grams of fat, and 450 grams of carbohydrates is best suited for their wants. The food for all persons of leisure should be selected with a view of preventing overtaxing the digestive tract, and the production of constipation with its attending evils, such as pelvic congestion, enlargement of the liver, hemorrhoids, and chronic dyspepsia. The legumes, coarse vegetables, and clarets should be avoided, but the use of light dry wines, fruits, and coffee instead of tea may be encouraged.

The importance of a good set of teeth for complete mastication and avoidance of bolting the food, in order to secure thorough insalivation, has already been pointed out; nor should we underrate the influence of our frame of mind upon this important physiological function. Every meal should be a feast; the food should be temptingly served and monotony avoided; relishes and flavors should not be wanting. Pawlow, in 1902, has shown that the primary secretion of true gastric juice is the result of a reflex starting in the mouth and that the relish of the food originates the reflex. In other words, he has experimentally demonstrated why certain tempting dishes, however inexpensive, "make our mouths water," and Hornborg, in 1904, has shown that distasteful food fails to cause gastric secretion.

GOOD FOOD AT REASONABLE COST.

[By C. F. Langworthy, Ph. D., expert in nutrition, Office of Experiment Stations, United States Department of Agriculture.]

The human body needs food, air, and water for its growth and maintenance just as do all living things. An engine can not run a machine or draw a train unless it has fuel, which is converted into energy or, as we say, which is used to generate power. In the same way the body must have fuel for the work of all sorts which it performs, for instance, for the work expended by a mason in laying stone, or by a carpenter in sawing or driving nails, by a woman who

sweeps or does her housework, or by a child who runs or plays, and the body must also have fuel for the work which goes on inside it, such as the beating of the heart, or the movement of the chest when we breathe, a sort of work which is less often thought about and so less familiar to most of us.

Everyone knows that a large engine requires more fuel than a small one, and that if the work is severe more fuel is needed than is the case when the engine is simply running and little or no work is done. It is the same way with the human body. A large, vigorous man needs more food than a small child or a woman who is not more than two-thirds his size, and if a man or woman is engaged in severe work each needs more food than when idle, the need being manifested by "a better appetite." Age also has a decided effect on the kind and amount of food needed, an aged man or woman naturally requiring less food than a man in youth or middle life, since the daily tasks and the amount of work done gradually decrease until in extreme old age most of the time is passed in quiet. Soft foods and simple dishes are more suited to old age, when teeth are few and body vigor is much less than in the prime of life, than are the hearty foods which strong men and women need. The infant needs the mother's milk and later the simple foods—eggs, milk, bread, vegetables, cereals, fruits, etc., which are the best foods for childhood and are most certain to build up a vigorous body. As childhood passes, the mixed diet with which most of us are familiar is commonly followed and, all things considered, is doubtless the most satisfactory for ordinary persons in health. Such a diet is made up of vegetables, fruits, flour and other products from cereal grains, meat, fish, dairy products, eggs, and so on.

Many persons have an idea that there is some special food, some ideal diet suited to each kind of work and to every condition of life, and that if we possessed full knowledge of the subject it would be desirable to prescribe the daily fare with the same care and accuracy with which a physician prescribes his medicines, but this does not seem to be the case. We do not regulate with such exactness the work we do, the leisure we take, the amount of clothing we wear, and all other conditions of our daily lives, and so it is for our best interest simply to regulate our diet along general lines in accordance with good sense, economy, and the knowledge which has been gained from a scientific study of the subject, taking care that the different foods are so combined that all the needs of the body are provided for, that excessive waste is prevented, and that both undernourishment and excess or overeating are avoided.

It is essential that foods should be of good quality, clean, and wholesome, and that they should be well cooked. The dishes that are most relished and the methods of preparing them will vary in different countries and in different regions of the same country, for each race, and, indeed, each region, has its favorite foods and its special methods of cookery. However, when the question of food is carefully studied, we find that value of the diet expressed in scientific terms is practically the same the world over when we consider persons of like size and weight performing equal amounts of work. This means that just as an engine of a given size would require in China the same amount of fuel for a given work which would be needed in the United States, so the human machine in any part of the world requires the

same amount of fuel, that is, food, for a given task which would be required in any other region.

With the engine it is immaterial whether the fuel be wood, coal, or anything else which is convenient, provided the quality is satisfactory and the engineer knows how to use it. With the human machine it is something the same. All ordinary foods are useful when rightly combined, and each country will naturally make use of the food supply which may be most easily and economically produced.

A study of the various materials which are used as food shows that they are composed of comparatively few constituents, namely, water, mineral matter, starch, sugar, and other bodies which are called carbohydrates, fat, and nitrogenous material commonly called protein, such as the white of egg and the lean of meat. The human body is made up of the same constituents. All of the body tissues contain the nitrogenous material, protein, which is similar to that found in the lean of meat, the white of egg, in gluten of wheat, etc., and so it is understandable that the body must be supplied with food containing nitrogenous material enough for forming this tissue and for replacing any which, like the skin, finger nails, etc., may be worn away by the various conditions of our daily life and also for other purposes for which the body requires protein. In the case of the infant the nitrogenous material needed for body growth is supplied by the milk—a food comparatively rich in this constituent as well as in the other nutrients. Later in life the nitrogenous material is supplied largely by milk, cheese, eggs, meat, cereals, beans, and similar foods.

As has been said, men, the world over, of like size and performing like amounts of work apparently eat practically the same amounts of food when considered from the standpoint of its composition, and students of nutrition questions are very generally of the opinion that this fact is more than a coincidence and that these average quantities eaten actually represent average needs. Values deduced from such observations are commonly referred to as dietary standards—that is, guides for food management.

Expressed in its simplest terms, the dietary standard for a man of medium size, say 150 pounds in weight, in good health and performing a moderate amount of work, calls for 100 grams (or 3.5 ounces) of nitrogenous material (protein), and fat and carbohydrates enough to supply with the protein 3,500 calories of energy in the amount of food provided per day. There is always some waste in cooking and serving food, and if we consider the food purchased the values are 115 grams protein (4 ounces) and 3,800 calories. These terms are unfamiliar to most persons, and it is unfortunate that some terms which are more familiar can not be found, but it is true here as everywhere else that each subject requires its own terms. We can measure cloth by the yard or milk by the quart, but we must measure work by horsepower or electricity by terms which are even less familiar. Fortunately, in the case of food and diet the matter can be explained in other ways so that the results can be applied in home management without undue difficulty.

The housekeeper who wishes to estimate the nutritive value of the food she prepares, in order that she may conform with the suggested dietary standards, can readily do so by the use of such a table as the one here given, which shows the protein and energy value of the por-

tions ordinarily served of the more common food materials, the values given being approximately only, as it would be hardly desirable to state absolute figures for such a purpose as that for which the table is designed.

The weights of the food portions included in the table are given in both grams, the unit of weight commonly used in scientific work, and in ounces, the more common household unit. To avoid unusual fractions of an ounce the nearest half ounce or quarter ounce or some similar common fraction is used instead of more accurate equivalents.

In such a table the protein content of the food gives an idea of its relative value for building body tissue. The value of the food as a source of power for carrying on work is expressed by the energy it supplies when utilized in the body as fuel is burned under a boiler, and is measured as calories. A calorie is equal very nearly to 1.54 foot-tons—that is, it represents force which would be sufficient to lift 1 ton 1.54 feet—and is a more convenient unit for such purposes than horsepower or other similar unit.

Approximate weight and nutritive value of an average portion of some common foods.

Kind of food.	Average weight of portion.		Average bulk of portion.	Protein, grams.	Energy, calories.
	Grams.	Ounces.			
1 slice of roast meat	85	3		13	197
1 portion of meat stew	325	11	Saucerful	32	461
1 Frankfurt sausage	60	2		11	170
1 pork chop	190	7		46	765
1 slice of boiled bacon	100	3½		15	432
1 portion of fried bacon	50	2		11	252
1 portion of steak	100	3½		26	411
1 portion of meat soup	190	7	Cupful	7	60
1 portion of pea or bean soup	190	7	do	7	70
1 cup or glass of milk	225	8	One-half pint	7	170
1 cup or glass of skim milk or buttermilk	225	8	do	7	85
1 portion of cream	65	2	One-half gill	2	120
1 egg	50	2		7	86
1 portion of butter	10	¼	1-inch cube		85
1 portion of cheese	20	¾		5	94
1 baked or boiled potato	140	5	Medium size, 3 inches long.	4	145
1 portion of turnip, beet, carrot, or similar vegetable.	130	4½	Saucerful	1	80
1 ear of green corn or 1 portion of stewed corn.	75	3	do	2	82
1 tomato or 1 portion of stewed tomato	95	3½	do	1	25
1 serving of cooked spinach, cabbage, or other green vegetable.	125	4½	do	2	40
1 portion of baked beans or black-eyed peas.	200	7	do	16	300
1 slice of bread	50	2	4 by 4 by 1 inches	4	175
1 portion of corn bread	50	2	3 by 3 by 1 inches	4	142
1 slice of cake	50	2	4 by 2 by 1 inches	3	190
1 slice of apple or other fruit pie	150	5	One-sixth of a pie	6	440
1 cup of flour	225	8	One-half pint	19	860
1 teaspoonful of sugar	10	¼			40
1 cup of sugar	225	8	One-half pint		890
1 portion of sirup or molasses	75	2½	About one-half gill		200
1 portion of cooked cereal	200	7	Saucerful	4	170
1 portion of dry ready to eat cereal	50	2	do	6	200
Milk for cereal	25	1	One-half gill	1	40
1 portion of boiled rice	140	5	Saucerful	4	155
1 portion of rice pudding, bread pudding, or similar custard pudding.	175	6	do	7	300
1 portion of cherry roll or similar pudding	175	6	Slice	8	460
1 apple or pear	100	3½			50
1 banana	100	3½			70
1 orange	125	4½			50
1 peach or 2 plums	75	2½			35
1 portion of stewed prunes	100	3½	Saucerful	1	115
1 portion of preserves	65	2½	do		150
1 portion of fresh berries	100	3½	do	1	35

The table may be conveniently used by supposing that the food eaten by one member of the family will represent in character and amount the food for the entire family. To estimate by means of the table the food value of the diet, the portions of each article used at each meal should be set down in order, together with the protein and energy which each supplies, and the total sum of the protein and of the energy will represent the amount eaten in the whole day.

Suppose, for instance, that breakfast for the man of the family, a mechanic, whose work calls for a medium expenditure of physical strength, consists of 2 slices of bread, 1 portion of butter, a potato, 2 cups of coffee, and 2 eggs. Each slice of bread, as the table shows, supplies 4 grams protein and 175 calories. Two slices would therefore supply 8 grams protein and 350 calories. A portion of butter supplies 95 calories of energy. Butter, as will be noted, contains no protein. One potato would supply 4 grams of protein and 145 calories; 2 eggs 14 grams protein and 192 calories. Tea and coffee in themselves supply so little nutritive material that they may be neglected. The sugar and cream, however, which would be used should be taken into account. If in each cup of coffee a teaspoonful of sugar is used, the amount for two cups would of course be two teaspoonfuls, and the energy value 80 calories. As the table shows, sugar contains no protein. When one-quarter gill of cream is used for each cup of coffee one-half gill will be used for two cups, and according to the figures in the table would supply 2 grams protein and 130 calories. If these foods eaten at breakfast and the protein and energy which they supply are set down in order and the quantities added together, the total shows the amount eaten for breakfast, as follows:

Food value of breakfast.

	Protein.	Energy.
	Grams.	*Calories.*
2 slices bread	8	350
1 portion butter	0	95
1 potato	4	145
2 eggs	14	192
2 cups coffee	0	0
2 teaspoonfuls sugar for coffee	0	80
One-half gill cream for coffee	2	130
Total	28	992

In the day's ration which has been selected we will suppose that the man carries his lunch and that it consists of two sandwiches (made from four slices of bread, one portion of butter, and two portions of cheese) a slice of cake, and a banana, and that for dinner he has one portion of beefsteak, one potato, one serving of turnips, an ear of corn, one slice of bread, one portion of butter, a dish of rice pudding, and one cup of tea with sugar and milk. Following the same method as was used in computing the value of breakfast, the lunch would supply the following.

Food value of lunch.

	Protein.	Energy.
	Grams.	*Calories.*
4 slices of bread for sandwiches	16	709
2 portions cheese for sandwiches	10	198
1 portion butter for sandwiches	0	95
1 slice cake	3	192
1 banana	0	70
Total	29	1,258

The protein and energy value of dinner computed in the same way would be as follows:

Food value of dinner.

	Protein.	Energy.
	Grams.	*Calories.*
1 portion beefsteak	26	411
1 potato	4	145
1 portion turnips	1	80
1 ear corn	2	82
1 slice bread	4	175
1 portion butter	0	95
1 dish rice pudding	7	300
1 cup tea	0	0
1 teaspoonful sugar for 1 cup tea	0	40
One-quarter gill milk for 1 cup tea	1	20
Total	45	1,348

The total protein and energy of the food eaten by the man during the day would of course be the sums of the amounts for breakfast, lunch, and dinner, as follows:

Food value of day's ration.

	Protein.	Energy.
	Grams.	*Calories.*
Breakfast	28	992
Lunch	29	1,253
Dinner	45	1,348
Total	102	3,593

As will be seen from the figures given above, the total protein for the day's ration is 102 grams, or 3½ ounces, and the total energy value 3,593 calories—values which correspond very closely with those called for by the suggested dietary standard. If a little more or a little less food were eaten these figures would vary somewhat, though the agreement might still be reasonably close. Suppose, for instance, that another portion of cheese had been used in making the sandwiches. This would have added 5 grams of protein and 94 calories, making the total amount 107 grams protein and 3,687 calories. Such variations are, of course, what might be expected and are of no particular moment. It is by no means necessary that the food each day should agree exactly with the suggested dietary standard, for any deficiency in protein or energy one day will very probably be offset by an excess

on some other day. It is believed, however, that the daily food will be most satisfactory when the average for long periods agrees with the suggested values. The calculated values obtained by the methods outlined above are designed simply to show in a general way whether the food corresponds to the dietary standard and to afford the housewife some knowledge as to whether the meals which she provides are sufficient as to the kind and amount of nutritive material which they furnish.

In the table on page 142 only the more common foods and staple dishes have been included. It will very often happen that other foods and dishes will be served. When this is done, and it is desired to calculate the relative value of the ration, no great error will ordinarily be involved if the values of the food most like the article in question are used. For instance, griddlecakes or waffles, which are often served at breakfast, are not given in the table. A griddlecake or a waffle so closely resembles a slice of bread in food value that the protein and energy for a slice of bread may be used to represent the food value of each griddlecake or waffle served. In the same way an ordinary portion of boiled lamb may be assumed to have the same food value as a slice of roast beef, and a portion of pork sausage the same food value as a Frankfurt sausage. If a housekeeper desires to study the subject in greater detail she will find an abundance of data regarding the composition of foods, etc., in bulletins of the United States Department of Agriculture and elsewhere.

In the calculations which have been described nothing has been said of the fact that women and children usually eat smaller amounts than men. Taking such factors into account would complicate the calculations, and it is therefore easiest to take into account simply the amounts which the man of the family eats, and to assume that, as the same sort of food is provided for the family, each member will receive the proper amount, and that if a diet for the man corresponds reasonably to the dietary standard the same may be supposed to be the case with that for the other members of the family. Young children, of course, would have milk or special foods, and so would be considered separately.

The ways in which meat, fish, vegetables, and other common foods can be prepared for the table are endless, ranging all the way from the simple boiled potato or fried egg to the most elaborate dish of the highly trained cook. The ideal for family living is enough variety in food and method of preparation to make the daily fare attractive without excessive cost or undue labor, and it is possible to attain this ideal. It is just as possible to make a dinner pleasing and satisfactory in every way from simple materials simply cooked as it is to make appropriate and attractive clothing for a child or grown person from inexpensive yet suitable and well-chosen materials. It is the way in which it is done as much as the materials used. Anyone who works in a mill or factory with a complicated machine knows that many things must be learned before the machine can be intelligently managed and that much practice is required before he can become a skilled operator. The same is true of selection and preparation of food and other household tasks, but it is equally true that the skill and ability which comes from good training is just as valuable in the home as it is in the factory or workshop, and that the well-trained worker can

accomplish better results with less trouble in a given time than the unskilled or poorly trained worker.

If we look over the long list of foods which we use and the dishes we make from them, it becomes evident that they are of two general sorts—those which, like bread, rice, potatoes, and many other foods, have little distinctive taste, and those like cabbage, onions, cheese, sweet foods, and many other dishes, which possess a pronounced and characteristic flavor. It also becomes evident, when the subject is studied, that the foods which are used in greatest quantity belong to the former class.

A little butter and jam make a slice of bread something which a child will eat with relish. It is equally true that it is the foods and dishes of distinctive flavor which very largely at least make the daily fare appetizing and satisfactory and which insure the consumption of enough of the staple foods, many of them lacking in flavor, to make the diet well balanced and adequate. This distinctive flavor or palatability which is so desirable may, in general, be attained in two ways—namely, by the use of foods which are in themselves of distinctive flavor, and by appetizing methods of cookery with proper seasoning.

The art of housekeeping in its highest form consists in planning the meals so that the two classes of foods are well balanced and the cost kept within bounds, as related to the income, with the labor involved not excessive.

Many housekeepers, since they have been well trained in youth by their mothers or in other ways have learned how to be good homemakers, instinctively provide tasty dishes in about the right proportion to the bread, potatoes, and other staple foods, and those who do not know how to do so should make the effort to learn. Such problems can often be solved by care and attention, and by means of schools and classes for home economics and the like ways of good housekeeping are readily taught. For instance, if we assume that bread of some sort and coffee and some of the ordinary cereals are the usual breakfast dishes, and they doubtless are with the majority of families in this country, the needed variety is readily secured by bacon or creamed fish, fish balls, eggs, honey, sirup, or other foods. If work is light and a hearty breakfast is not needed, fried potatoes (perhaps seasoned with onions), fried apples, or some similar dish is a palatable addition to creamed toast, cereal, or the bread and butter which makes up the principal part of the meal if that is not thought to be enough.

Tea and coffee as a part of breakfast or other meal owe their food value mainly to the sugar and milk or cream commonly taken with them. Cocoa in itself contains rather more nutritive material than either tea or coffee, but also owes its food value for breakfast or any other meal largely to the milk and sugar which are used in making it. It is usually considered more satisfactory for children than either tea or coffee. The value of milk as a beverage, particularly for children, must never be overlooked. Skim milk is not usually fully appreciated for this purpose. It is, of course, "thinner" or "less hearty" than whole milk, as it has less fat (cream)—but is still a nutritious food—and though rather dilute, like all liquid foods, is well worth using in quantity.

When the man of a family takes his lunch away to his work something should be provided which is palatable as well as capable of satisfying hunger. Cold meat, a little smoked fish, or a chopped boiled egg will make a sandwich which is more palatable and more nutritious than plain bread and butter, and cheese of different kinds, cold bacon, and many other things may be used in the same way, while an apple, a banana, or a piece of cake or something similar will undoubtedly be relished as much as the hearty food. If the children come home from school they and their mother should have something which is suited to their needs and yet which does not involve too much trouble. Bread and milk, or cereal and milk, with fruit, fresh or cooked, are all simple and easily prepared dishes which are suitable for the purpose, while bread and butter with a little cold meat, fruit, tomatoes, or any left-over foods which are relished will also answer the purpose.

The evening meal under such circumstances would naturally be the heaviest meal of the day. If dinner is eaten in the middle of the day and supper at night, the suggestions made for lunch may be applied to supper, but some hot dish is an addition which most persons relish for supper. Creamed chipped beef, hash, meat croquettes, oysters in season, and similar dishes suggest themselves, but if so hearty foods are not wanted creamed potatoes, corn chowder, fried tomatoes, and others may be readily prepared.

When roast beef, which is usually an expensive dish, is the principal item of a dinner, the cost of the meal may be kept within reasonable limits by serving inexpensive vegetables and dessert. Any meat left over from the roast should be used for some other meal, either cold or made into a meat pie, meat croquettes, hash, or some other made dish, while any bones and scraps made into a well-seasoned thick soup may form the principal dish at still another meal.

Hamburg steak, round steak, ham, and sausages are meats which may be readily cooked and which are appetizing, while pork chops have always been a favorite and are usually considerably less expensive than similar cuts of beef or lamb.

Herring, mackerel, and other sorts of fish, when in season, make a pleasant variety and are as nutritious as meat. Perhaps fish is most commonly fried, but boiled fish with a well-made sauce, or fish stuffed and baked, is as easily prepared and adds variety.

Custom has made it almost compulsory in this country to have some sweet dish at dinner, and the custom is reasonable, as such foods are palatable, and although badly made pastry and other desserts are frequent causes of digestive disturbances such dishes when well made and eaten at suitable times in reasonable quantity are generally conceded to be wholesome and are reasonably nutritious.

A housekeeper who plans her meals rationally will serve a light dessert like stewed fruit with or without simple cakes or cookies, a simple rice pudding, or some similar dish with a hearty meat, and the heavy puddings, such as apple dumplings, suet pudding, etc., when the rest of the dinner is not so hearty.

Beets, cabbage, onions, carrots, spinach, green corn, tomatoes—indeed, all the ordinary vegetables—are wholesome, valuable foods and should be used liberally. They contain a good deal of water and are bulky in proportion to their nutritive value, but this is in their favor.

By care and thought in selecting and by different methods of cooking vegetables and other foods it is easy to vary the dinner from day to day without too much labor.

When most fresh vegetables are out of season or high in price, hominy, rice, fried corn-meal mush, and similar dishes are pleasant changes from canned corn, canned tomatoes, and other canned goods which are so much used to supplement potatoes, the standard vegetable in most American homes, and which, when of good quality, are useful foods.

Fresh fruits are always attractive additions to the diet and may be made to furnish a considerable amount of nutritive material. Canned fruits, jams, jellies, and the like are all valuable additions to the diet, useful for their nutritive value and for their palatable flavor.

In earlier times in New England creamed salt codfish with baked potatoes, boiled salt salmon with drawn butter, boiled salt codfish with beets and boiled potatoes, and pork and beans were simple, inexpensive, and appetizing dinner dishes which were very commonly used. These foods are wholesome, nourishing, and have always been favorites in large numbers of families. Fried salt pork or bacon, well cooked, with cream gravy, and served with fried eggs and baked potatoes, is another old-fashioned dinner which retains its popularity, particularly in rural regions. Some such dish as this with hot corn bread, some vegetable which is in season, and a rice pudding or some other simple dessert makes a meal which is appetizing, adequate, easily prepared, and not expensive.

In the Southern States hominy and rice, like corn breads of different sorts, have always been favorite dishes of reasonable cost. Corn bread and buttermilk is an old-fashioned combination which is well worth more extended use, for it is nutritious, wholesome, and to most people palatable.

The dishes and food combinations which have been mentioned are only suggestions, for each housewife must of necessity suit her meals to the tastes of her family, and food customs differ decidedly with regions and with other circumstances. The southerner will relish bacon and greens, fried chicken, corn bread, and many other dishes for which southern cooks are famous, while the northerner will perhaps prefer fish-balls, baked beans and brown bread, or "a boiled dinner" of corn beef with vegetables, or some similar dish with which he has always been familiar. Families of Italian origin or descent naturally use macaroni, which they cook in such appetizing ways with tomatoes, cheese, or other seasoning, salads with an abundance of olive oil, and other dishes which are typical of Italy, while the Germans will more commonly select noodle soup, pork cutlet with cabbage or sauerkraut, apple cake, and many of the other characteristic and appetizing German dishes.

Readiness to adopt new ideas is characteristic of American life and, as might be expected, many of the typical dishes of other countries have become well known on most tables, and this may well be the case for, after all, the staple foods which are always in market and reasonable in price are not too numerous and new methods of cooking mean a pleasant variety.

In general, it is true that to be reasonable in cost usually means that more time is required for the preparation of a meal or a dish than is the case when cost is not taken into account. A steak or chop

which can be quickly cooked is more costly than a stew, than beef or veal loaf, beef à la mode, pot roast, beef with horse radish, boiled mutton with white sauce, or any of the other appetizing dishes which can be made from the cheaper cuts of meat. The stew owes its palatabiltiy very largely to the onions or other seasoning, or to the fact that the meat was browned in a pan before it was stewed, and its pleasing texture to the long, slow cooking which makes tough meat tender. The steak or chop is in itself more tender and full of flavor than cheaper cuts, so it is reasonable that a simpler method of cooking is required for it. That such dishes as stews, etc., are very generally relished by people in all circumstances is shown by the fact that they so often appear on menus in expensive hotels and restaurants, as well as those where prices are cheaper, though more often as luncheon than dinner dishes, and find their way to most tables—no matter how large or how small the income.

Granting that the foods are wholesome and suitable, the final test with foods, after all, is skill in preparation. The simplest dish well cooked is always superior to an elaborate dish indifferently made and simple meals in the long run are more relished than those which are very elaborate.

The housekeeper who manages her home with little or no help except that which other members of her family give has no time to waste on the entrées, elaborate cakes, and other sorts of "food fancy work" for which recipes are so frequently published and which many people seem to consider a mark of good living. It should be said that well-informed housekeepers long ago recognized that the majority of such dishes can not be satisfactorily prepared except by an unusually skillful cook and that, though entirely appropriate for special occasions and under many circumstances, they have little place in the everyday bill of fare. Furthermore, most persons tire of such dishes much more quickly than they do of foods prepared by simpler methods.

As time has progressed very many household industries have become the subject of careful study with the result that they now rest on a sound scientific basis.

The perfection which has been reached in spinning and weaving and other manufacturing enterprises, which have grown out of home industries, is a proof of what may be accomplished by a scientific study of domestic problems and an indication of what may be expected when careful consideration is given to food and nutrition as a part of home work by all housekeepers.

In the development of labor-saving devices household work has not kept pace with farm work or with general manufacturing. However, at the present time new interest seems to have been aroused in this question, and dishwashers, bread and cake mixers, and similar devices which are on the market, and hay boxes or fireless cookers are becoming fairly well known. When such devices are found to be fairly satisfactory they should find a place in the home with the washing machine and the carpet sweeper as a means of lessening the labors of the housekeeper.

No carpenter can build a house or carry out even a simple enterprise without a plan, and the better the plan the easier and more satisfactory will be the work, other things being equal. With the housekeeper the same is true. Thought and system are important

time and strength savers. We do not need to live by rote, but simply to carry on the household tasks according to some definite plan which is flexible enough to permit of the variations made necessary by circumstances.

The housekeeper who will take advantage of opportunities to learn something regarding the relative nutritive value of different foods and their real worth as distinguished from their market value, and who understands good, sensible methods of cooking and serving food, and who will plan her meals and other household work so that unnecessary labor may be avoided, will be able to provide her family with a reasonable and palatable diet without undue labor or excessive cost. Thanks to its varied climate and soil, the United States produces all staple foods in great variety, as well as the majority of those which are usually termed "luxuries," and for this and other reasons the food problem is a simpler one than is the case in many other countries where food materials are less plentifully grown and prices are higher. Good, substantial food, pleasing to the eye as well as satisfying the body, is within the reach of all, and when wholesome, well-prepared meals are the rule in our homes and women's work in the household is carried on generally with the system and precision which were long ago introduced into the trades and manufacturing industries, then household work will be less a burden and the family will be healthier and better in every way.

FOOD AND HOME BETTERMENT.

[Introduction by Geo. M. Kober, M. D.]

In our sociological study of families in this city we found that 476 families, with an income of $500 or less, expended 43.68 per cent of their annual income for food; 159 families, with an income of $500 to $600, 43.59 per cent; 153 families, with an income of $600 to $700, 41.40 per cent; and 153 families, with an income of $700 to $800, 40.21 per cent for food. The question of food, while of importance to all classes in its relation to health and efficiency, is of special significance from an economic standpoint in families with limited means. It has been well said that "half the struggle for life is the struggle for food." Many of the problems connected with the nutritive value of farm products and other foods, the preparation of food for the table, the digestibility, palatability, and utilization of different foodstuffs, the hygienic and economic aspect of the question have received careful attention in the nutrition investigations conducted by the Office of Experiment Stations, United States Department of Agriculture. It may be truly said that these investigations have been a constant source of information and inspiration to teachers of domestic science in public schools and colleges, to settlement workers, persons in charge of charitable institutions, and others interested in the social betterment of their less resourceful neighbors. The work is of the utmost value, and, while much has been accomplished, it should be continued in the interest of home economics and home betterment.

It has been found, over and over again, that persons of limited means purchase food containing little or no nutriment, or select needlessly expensive kinds of food, or prepare a diet altogether too one-sided, and last, but not least, know little or nothing about the art of cooking, and thus impair not only the nutritive value of the food,

but also the digestive functions and general health as well. In order to give housekeepers whose income is $1.50 a day an opportunity to prepare suitable dishes for a family of 6—2 adults and 4 children—Miss E. M. Cross, of the McKinley Manual Training School, has prepared suitable menus for winter and summer use which it is hoped will stimulate interest in the subject. Miss Cross assures me that she has verified the market prices personally and that the food can be purchased at the figures given. For reasons already stated butterine may very properly replace butter in families with small means, and for hygienic reasons bread twenty-four hours old is really superior to fresh bread. The writer desires to emphasize the fact that beans, peas, and lintels, containing, as they do, much protein, can replace from time to time the more expensive meat and egg ration.

The nutritive value of skim milk, buttermilk, and cottage cheese, and the cheaper fish meats should also be more fully appreciated. To limit the expenditure for food, with an income of $1.50 to an average of 75 cents a day for a whole family, is no small undertaking and requires experience and judgment which are best obtained in our cooking schools. It is sincerely hoped that every girl will take a deep interest in matters of cooking and domestic economy. Every housewife should supply herself with scales and follow the general directions given in the cooking recipes with precision. All the quantities given are for a family of six, and reductions are made accordingly, remembering always that hard-working men and nursing or pregnant women, and convalescents from acute diseases, require a more liberal diet. If, in spite of good cooking, there should be evidence in any member of the family of malnutrition and impaired health it will be well to consult a physician. Miss Cross is entirely responsible for the following menus and cooking recipes, and is entitled to the credit for whatever merit they possess:

MENUS FOR WINTER MONTHS.[a]

	Protein.	Energy.	Cost.
	Grams.	*Calories.*	*Cents.*
Monday:			
Breakfast—Hominy, skim milk, creamed hake, toast, butter, coffee	28	1,058	18
Dinner—Irish stew with dumplings, boiled rice, cold slaw, apple pie	54	1,711	31
Supper—Cottage cheese, bread, butter, molasses, tea	13	819	23
Total	95	3,583	72
Tuesday:			
Breakfast—Rice cakes (left-over rice), kidney stew, entire wheat bread, coffee	44	1,176	16
Dinner—Corned beef, boiled potatoes, spinach, tapioca with milk and sugar	28	842	71
Supper—Fried mush, cold corned beef, bread, butter, tea	29	1,196	10
Total	101	3,214	97
Wednesday:			
Breakfast—Stewed prunes, meat cakes, corn bread, butter, coffee	23	771	27
Dinner—Split pea soup, braised beef's heart, boiled cabbage (corn beef liquor), boiled onions, potatoes, apricot roll, vanilla sauce	56	1,572	44
Supper—Corned beef hash, bread, butter, tea	29	1,002	18
Total	108	3,345	89
Thursday:			
Breakfast—Rolled wheat, skim milk, Potomac herring, corn bread, butter, coffee	26	886	19
Dinner—Salt pork, potatoes, turnips, escarolle, apple butter, short cake	61	1,880	29
Supper—Pigs' feet, potato cakes, bread, butter, coffee	23	840	28
Total	110	3,226	76

[a] For quantities of material to be used when not given in cooking recipes, see p. 156.

MENUS FOR SUMMER MONTHS.

	Protein.	Energy.	Cost.
	Grams.	*Calories.*	*Cents.*
Friday:			
Breakfast—Corn flakes, skim milk, salt-water trout corn dodgers, coffee	28	896	.26
Dinner—Stewed tripe, boiled potatoes, stewed onions, raw tomatoes, bread, rice pudding	37	1,175	.35
Supper—Beef stew, corn cakes, butter, stewed apples, tea	41	1,035	.28
Total	106	3,106	.89
Saturday:			
Breakfast—Fried tomatoes, bacon, bread, butter, coffee	31	1,054	.13
Dinner—Boiled leg of mutton, boiled rice, green corn, summer squash, bread, gingerbread	32	1,014	.97
Supper—Cottage cheese, baked potatoes, raw onions, bread, butter, gingerbread, tea	25	1,048	.23
Total	88	3,116	1.33
Sunday:			
Breakfast—Boiled eggs, Potomac herring, corn bread, butter, coffee	35	818	23
Dinner—Chartreuse of mutton, tomato sauce, boiled potatoes, string beans, blackberries, milk	44	1,187	19
Supper—Rice muffins, baked tomatoes, apple butter, coffee	41	1,066	14
Total	120	3,071	56

COOKING RECIPES FOR WINTER MENUS.

Creamed hake.—After freeing 2 pounds of the fish from bones and skin, flake it, then cover it with boiling water, put a cover on the pan and keep it on the back of the stove for ten minutes. Drain the water from it, then pour cream sauce over it and serve.

Cream sauce.—Two tablespoonfuls butter, 2 tablespoonfuls flour, 1 cupful milk, one-half teaspoonful salt, one-eighth teaspoonful pepper. After melting the butter over steam, or on a cool part of the stove, add the flour and stir over the fire for one minute. Add the milk and the mixed salt and pepper, then stir the mixture until it thickens, after which cook over steam for ten minutes. Serve while hot.

Irish stew with dumplings.—One pound beef (brisket), 1 slice salt pork, 1 onion, 4 potatoes. Cut the meat into 2-inch pieces, then dredge them with flour and brown them all over in the pork fat with the sliced onion. Cover the meat and onion with boiling water and let the mixture cook slowly on the back of the stove. In the meantime pare and dice the potatoes and boil them for ten minutes, then drain the water from them and add them to the stew when the meat is tender. When the potatoes are nearly done, put in the dumplings, pouring off the liquid, if necessary, so they will rest on the potatoes. Keep the pan closely covered and let the stew cook for ten minutes. Take out the dumplings, season the stew with salt and pepper, and put it in the center of a platter, then place the dumplings around the edge.

Dumplings.—One pint flour, one-half teaspoonful salt, 1 cupful milk (scant), 3 teaspoonfuls baking powder. Make a soft dough and flatten it out half an inch thick, then cut into small rounds or mix softer and drop by the spoonful into the hot stew.

Cold slaw.—One-fourth pound salt pork, 4 tablespoonfuls vinegar, 1 onion, 1 teaspoonful salt, one-third medium-sized head of cabbage. Put the pork into a pan with half a cup of water; let it boil until the water evaporates, then cook until the pork is brown and crisp. When the fat is cool, add it to the rest of the ingredients and pour the mixture over the thinly sliced cabbage.

Apple pie.—One and one-half cupfuls flour, 1 teaspoonful salt, 8 tablespoonfuls drippings, about three-fourths cupful ice water. After sifting the flour and salt together add the shortening and mix by cutting together with a knife, add the water slowly, still mixing with a knife, until a dry, crumbly paste is formed, but all of the flour is moistened. Turn this out on a board without flour, and after rolling it into a thin sheet turn the paste around and roll again. Continue this process until the materials are well blended and the paste is smooth. Keep in a cool place until it is quite firm. It is better kept over night. Roll out one-half of the paste to fit the pie pan, cover this with a layer of apples,

which have been cored, pared, and cut into thin slices across the core. Sprinkle with sugar and a little cinnamon. Continue to put in these layers until the pan is full, having it higher in the center than on the sides. Put on a cover of pastry, fasten the edges down, then trim the pie, holding the knife well under the plate. Make several openings on the top for the escape of steam, then bake it in a moderately hot oven until it is brown, about thirty minutes. Remove it at once from the plate and serve either hot or cold.

Corn Bread.—One pint meal, 1 teaspoonful salt, 1 tablespoonful fat from bacon, 1 teaspoonful soda, 1 pint sour buttermilk. Pour over the meal enough boiling water to scald it. The meal must be moist, not wet. Add the shortening, salt, and the soda, which has been mixed with a little cold water. Stir this until it is thoroughly mixed, then put in the milk. Bake it in a quick oven in shallow pans for about forty-five minutes. Serve at once.

Kidney stew.—Split the kidneys lengthwise in halves and trim off every bit of sinew and fat from the inside, then cut the kidneys into small pieces. Put them into a saucepan and cover them with cold water; then heat the water until it is nearly boiling. Drain this water off and cover the kidneys again with cold water; then heat the water as before. Repeat this, thus making three treatments. Be careful each time that the water does not boil at all, or the kidneys will be hard and tough. Discard all the water. Reheat the kidney in a brown sauce, season it with salt and pepper, and serve it.

Brown sauce.—Two tablespoonfuls butter, 2 tablespoonfuls flour, 1 cupful stock or water, one-half teaspoonful salt, one-eighth teaspoonful pepper. After browning the butter add to it the flour and brown this mixture, then add the stock or water and stir until it is thick. Season and add the prepared kidney. Serve at once.

To boil corn beef.—Wash the meat well and put it on in cold water. Bring slowly to simmering point and let it simmer thirty minutes for every pound of meat. If the meat is to be served cold allow it to cool in the liquor in which it was boiled.

Tapioca with milk and sugar.—Cover 1 cup of flake tapioca with cold water and let stand over night. In the morning drain the water from it and add 1 quart of hot water. Cook over a slow fire until it is quite transparent, then add a pinch of salt and the rind and juice of 1 lemon. Pour this into molds which have been wet with water and keep in a cool place. When firm turn them out on a platter and serve with milk and sugar.

Fried mush.—One pint water, 1 teaspoonful salt, one-half cupful yellow meal, 1 egg. Scatter the meal slowly into the boiling salted water, stirring constantly, then let the mixture bubble once or twice. Place the pan over hot water and let it cook for two hours, after which turn the mush into a square pan and keep in a cool place until it is firm. Cut it into slices half an inch thick and cover them with the beaten egg, which has been mixed with 1 tablespoonful of cold water. Cook these in smoking hot fat (enough to cover the pieces) until they are a golden brown. Serve at once.

(NOTE.—Two saucepans may be used for cooking the mush, the smaller one resting on a piece of wire gauze in the bottom of the larger one, which contains water. The fat used is made from the small pieces of fat meat which may be purchased from the butcher at 2 cents per pound. The fat is strained and kept in a cool place for future use.)

Stewed prunes.—After washing 1 pound of prunes, cover them with cold water and let them stand for several hours. Put them on the stove in the same water and let them cook slowly until a straw will go through them easily. Put the prunes in a dish, sweeten the liquid, let it boil for two minutes, then pour it over the prunes.

(NOTE.—All dried fruits should be soaked in the water before they are cooked.)

Meat cakes.—One pound beef, 1 teaspoonful salt, one-eighth teaspoonful pepper. Use the lower part of the round, which may be purchased in some markets for 6 cents per pound. Grind the meat or have the butcher chop it with a cleaver until it is quite fine, then mix the seasoning with it, and shape it into small cakes, having the edge as thick as the center. Put enough fat in a hot spider to keep the meat from sticking to the pan, put in the cakes, and shake the pan over the fire until they are brown all over. Now let them cook more slowly, allowing seven minutes if they are an inch thick, turning them occasionally. After taking out the cakes, put into the pan 1 tablespoonful of drippings and the same amount of flour, stir well, then add half a cup of cold

water and cook until it thickens. Season with salt and pepper and serve with meat cakes.

Split pea soup.—One cupful split peas, 6 pints cold water, 1 onion, 2-inch cube salt pork, 2 tablespoonfuls drippings, 2 tablespoonfuls flour, 1½ teaspoonfuls salt, one-eighth teaspoonful pepper. After picking over the peas, wash them and let them soak in the cold water for five or six hours. Add the pork and onions, which have been cut into small pieces and cooked until they are a light brown. Let this mixture cook slowly for about four hours, after which strain it, mix the fat with the flour and add to the soup, stirring constantly until the mixture thickens, then let it cook for ten minutes. Season and serve at once.

Braised beef's heart.—After soaking the heart in cold water for three hours, remove the muscles from the inside and the blood. Make a forcemeat of 1 cup of bread crumbs, 2 tablespoonfuls of drippings, 1 teaspoonful of thyme, 1 tablespoonful of chopped celery tops, 1 teaspoonful of onion juice, half a teaspoonful of salt, one-eighth of a teaspoonful of pepper. Mix and stuff the heart. Tie it together with twine, and put it into a pan which has a close-fitting cover. Add enough boiling water to half cover the heart, put on the lid, and cook in a moderately heated oven for three hours. Brown 2 tablespoonfuls of fat, add 2 tablespoonfuls of flour, and when well mixed, add the water in which the heart was cooked. Stir until it thickens, season with salt and pepper. Dish the heart and pour the sauce over it, then serve.

Apricot roll.—Two cupfuls flour, one-half teaspoonful salt, one-third pound suet, 1 pint apricots. Free the suet from the fiber and skin, then chop it fine or press it through a wire basket. Mix this with the flour and salt and add gradually enough cold water to make a soft dough. Roll it out on a floured board into a sheet about an inch thick, spread the apricots thickly over the dough, roll it up and tie it in a well-floured cloth, leaving plenty of room for it to swell. Put it into a pot of boiling water and boil for two hours, or it may be steamed two hours and a half. Serve hot with vanilla sauce.

Vanilla Sauce.—Two tablespoonfuls butter, 2 tablespoonfuls cornstarch, one-half cupful sugar, 1½ cupfuls water, 1 teaspoonful vanilla. After heating the butter and water to boiling point, stir in the mixed cornstarch and sugar. Cook the mixture for ten minutes, then flavor and serve.

Corned-beef hash.—One pint finely chopped beef, 1 pint boiled potatoes, one-half teaspoonful salt, one-eighth teaspoonful pepper, 2 tablespoonfuls fat. Cut the potatoes into small pieces and mix them with the rest of the ingredients. Put this into a heated spider, add enough hot water to moisten and stir until the mixture is well heated, then pack it closely in the pan, cover it, and let it cook until it is well browned on the bottom. Turn it out on a platter and serve.

Apple butter short cake.—One pint flour, 1 teaspoonful salt, 3 tablespoonfuls drippings, 2 teaspoonfuls baking powder, milk or water (about three-fourths cup. Sift the flour with the salt and baking powder, then add the fat, and mix well. Pour in the water slowly, mixing with a knife until a soft dough is formed. Turn it out on a floured board and, after surrounding it with flour, roll it into a thin sheet about half an inch thick. Cut it into four-inch squares and bake them in a quick oven until they are a light brown, about twenty minutes. Split each square and put the apple butter between. Serve while hot.

Pigs' feet.—After scraping a set of four of the feet soak them in cold water for several hours, then wash and scrub them. Split the feet and put them on in cold water and let them simmer until tender. Put them in an earthen jar, season with salt and pepper, and pour over them hot spiced vinegar. They will be ready for use the next day.

Spiced vinegar.—Boil for one minute a half-pint of cider vinegar, 12 whole cloves, 3 inches of cinnamon bark, and 2 bay leaves.

Potato cakes.—Mash 1 pint boiled potatoes, then season them with salt and pepper, and moisten with hot milk. Make into cakes and brown in a pan with a small quantity of fat. Serve hot.

RECIPES FOR SUMMER MENUS.

Corn dodgers.—Two cupfuls white meal, 6 tablespoonfuls skim milk, 2 tablespoonfuls shortening, 1 teaspoonful salt. After scalding the meal with boiling water, using just enough to moisten the meal, add the shortening and stir until it is well mixed, then put in the salt and milk. Put the mixture by spoonfuls in a large baking pan, flatten into small cakes, and keep them separate. Bake in a moderately heated oven until brown on both sides, then serve.

Stewed tripe.—Two pounds boiled tripe, 2 ounces salt pork (ham may be used) one-half medium sized onion, 1 tablespoonful chopped parsley, 1 bay leaf, 2 tablespoonfuls flour, 1 pint milk, 1 teaspoonful salt, one-eighth teaspoonful pepper. Cut the tripe into pieces about 1½ inches long and a half inch wide. Dice the pork and put in a pan with the sliced onion and the bay leaf. Stir over the fire until quite brown, then add the flour, and when well mixed add the milk. Stir this until it is as thick as ordinary cream, after which put in the salt, pepper, and the tripe, and keep over a very moderate fire for five minutes. Add the parsley and serve at once.

Rice pudding.—One-half cupful rice, one-half cupful sugar, 1 pinch of salt, 1 quart of milk. After washing the rice thoroughly, let it soak in the milk for half an hour, after which add the salt and sugar. Pour the mixture into a deep pan, cover it and let it bake about two hours, slowly at first, until the rice has softened and thickened the milk, then let it brown slightly. This may be served hot or cold.

Beef stew.—One pound plate or brisket, 4 potatoes, 1 teaspoonful salt, 1 carrot, 1 tablespoonful fat, 1 tablespoonful flour, one eighth teaspoonful pepper. Cleanse the meat by wiping it with a damp cloth or by scraping it with the back of the knife. Cut it into pieces about 2 inches square, and put it into a saucepan with the bones and sliced carrot. Pour over this enough boiling water to cover well, about a pint and a half, and let it simmer until the meat is tender, then add the diced and parboiled potatoes. When the potatoes are done, thin the mixed fat and flour with a little of the hot liquor from the stew, and after pouring it into the stew stir it until it thickens slightly. Cook a few minutes longer, then remove the bones, season and serve.

Corn cakes.—One pint meal, one-half cupful flour, 1 pint sour buttermilk, 1½ teaspoonful soda, 1 tablespoonful fat, 1 egg, 1 tablespoonful salt. Scald the meal with sufficient boiling water to moisten, then put in the fat and stir until well mixed. When this is cool add the salt, flour, and the buttermilk. Stir in the beaten egg and the soda, which is mixed with a little cold water. Bake in small cakes on a lightly greased hot griddle.

Gingerbread.—One cupful molasses, one-third cupful drippings, 1 teaspoonful soda, one-half teaspoonful salt, 1 cupful sour buttermilk, 1 tablespoonful ginger, 3 cupfuls flour, 1 teaspoonful cinnamon, one-half teaspoonful allspice. After mixing the salt and spices with the molasses add the fat, after which add flour and buttermilk alternately, then beat until perfectly smooth. Stir in the soda, which is mixed with a little cold water, and partly fill greased gem pans with the batter. Bake in a moderately hot oven about thirty minutes or until the cakes are a light brown.

Chartreuse of mutton.—One cupful cooked chopped mutton, 1 teaspoonful chopped parsley, one-half teaspoonful onion juice, 1 teaspoonful lemon juice, one-fourth teaspoonful salt, 2 tablespoonfuls butter, 1 cupful stock or water, 2 tablespoonfuls flour, little cayenne. Make sauce as directed for cream sauce, then add the rest of the ingredients and mix thoroughly. Line a greased mold with hot boiled or steamed rice, having the layer about half an inch thick, then fill the center with the mutton mixture and cover the top evenly with rice. Steam forty-five minutes, then turn from the mold and serve with tomato sauce. The greased mold may be coated with bread crumbs, then lined with mashed potatoes and, after filling with the mutton, covered with potato. Bake.

Tomato sauce.—Two tablespoonfuls drippings, 1 cupful strained tomatoes, 2 tablespoonfuls flour, one-half teaspoonful salt, one-eighth teaspoonful pepper. After melting the fat add the flour and cook for one minute, then add the strained tomatoes, the salt, and the pepper. Stir until it thickens, then serve.

Scrapple.—Four pints water in which the lamb was cooked, 1 pound scrap meat, 3 teaspoonfuls salt, 1 teaspoonful thyme, 1 teaspoonful sweet marjoram, 1 pint meal, one-fourth teaspoonful pepper. After cleansing the meat, by wiping it with a damp cloth, cut it into small pieces and cook it slowly in the mutton broth until it will easily separate. See that there is one quart of the liquid and that the meat is in very small pieces. Season the mixture of water and meat, put it on the stove and, when it reaches boiling point, stir in the meal. Cook over hot water for two hours, then add the thyme and marjoram and, when well mixed, turn it into square pans and stand away to cool. When this is firm cut it into slices and brown in a little fat.

Rice muffins.—Two and one-fourth cupfuls flour, 1 cupful milk, three-fourths cupful hot rice, 1 egg, 5 teaspoonfuls baking powder, 2 tablespoonfuls butter or drippings, 1½ teaspoonfuls salt. After mixing the flour with the salt add the rice, which has been pressed through a strainer, and the milk which is

mixed with the beaten yolk of the egg. Beat until the batter is quite smooth, then add the melted fat, stir in carefully the baking powder and then fold in the stiffly beaten white. Partly fill greased gem pans with the batter and bake in a moderately hot oven until a light brown, about thirty minutes. Serve hot.

Market price of goods.

Article.	Unit.	Cost.	Article.	Unit.	Cost.
WINTER.		Cents.			Cents.
Apples	Quarter peck	10	Pigs' feet	Set	8
Apple butter	Jar	8	Potomac herring	Dozen	8
Bacon (country)	Pound	10	Potatoes	Peck	20
Beef:			Prunes	Pound	5
Part of the round	do	6	Rolled wheat	Package	10
Brisket and plate	do	6	Salt pork	Pound	7
Corned	do	6	Salt water trout	do	10
Beef's heart	do	8	Sausage	3 pounds	25
Beans	Quart	9	Skim milk	Quart	6
Broken rice	Pound	3½	Spinach	Quarter peck	10
Bread (stale)	Loaf	5	Split peas	Pound	6
Butter	Pound	30	Sugar	do	5
Buttermilk	Quart	5	Tea	do	15
Cabbage	Head	5	Tripe	2 pounds	25
Coffee	Pound	13	Turnips	Quarter peck	5
Corn flakes	Package	10	SUMMER.		
Cottage cheese	Pint	6			
Escarolle	Head	5	Apples	Quarter peck	8
Evaporated apricots	Pound	10	Beets	3 bunches	5
Flake tapioca	do	8	Blackberries	Quart	5
Flour	6 pounds	18	Butter	Pound	20
Hake	Pound	5	Cabbage	Head	5
Hominy	Quart	4½	Corn	Dozen	10
Kidney	Each	8	Eggs	do	15
Meal	Pound	2	Onions	3 bunches	5
Molasses	Quart	8	Potatoes	Bushel	65
Mutton:			Spinach	Quarter peck	5
Breast	Pound	7	String beans	do	5
Fore leg	do	10	Summer squash	Dozen	5
Neck	do	6	Tomatoes	Quarter peck	5

Quantities of materials to be used for a family of six when not given in cooking recipes.

BREAKFAST.

Uncooked hominy	cupful	1
Skim milk	gills	3
Toast	loaf	[a] 1
Butter	ounces	[a] 3
Coffee	tablespoonfuls	4
Kidney		1
Stewed prunes	pound	1
Rolled wheat	cupful	1
Potomac herring		3
Corn flakes	cupfuls	2
Fried tomatoes		8
Boiled eggs		12

DINNER.

Uncooked rice	cupfuls	1½
Corned beef, for 3 meals	pounds	8
Potatoes, 3 in. long		12
Spinach	peck	½
Milk for tapioca	gills	3
Sugar for tapioca	tablespoonfuls	2
Beef's heart		1
Boiled cabbage	head	½
Boiled onions		6
Potatoes		6

[a] Same quantity each time used.

Salt pork	pound	¼
Turnips (mashed)		8
Potatoes		6
Escarolle	head	1
Raw tomatoes		6
Leg of lamb, for 3 meals	pounds	7
Rice	cupful	1
Corn	ears	12
Squash		4
String beans	peck	½
Blackberries	quart	1
Milk	gills	8

SUPPER.

Cottage cheese	pint	1
Molasses	gills	8
Pig's feet	set	1
Potatoes		8
Apples	peck	½
Cottage cheese	pint	1
Potatoes		9
Onions (raw)		6
Tomatoes	peck	½
Apple butter	pint	½

CHAPTER III.

THE CAUSATION AND PREVENTION OF DISEASE.

DANGER PERIODS IN LIFE.*

According to a French medical journal the annual mortality of the entire human race is 33,000,000 persons. A fourth of the race die before completing their eighth year, and one-half before the end of the seventeenth year, but the average duration of life is about 38 to 40 years. Not more than one person in 100,000 lives to be 100 years old. ("Medical Record." February 27, 1892.)

During life the fluids and tissues of the body are constantly undergoing changes; new matter is formed and the old is removed with ceaseless activity. The body is indeed a complex machine in which the law that force is generated by decomposition is fully carried out. Every motion of the body, every pulsation of the heart, nay, even every thought, is accompanied by the destruction of a certain amount of tissue. As long as food is supplied in sufficient amount and the assimilative functions are not disordered, reparation proceeds as rapidly as decay, and so long as these two actions exactly counterbalance each other life and health, unless, of course, in case of accident, continues.

The human body has been aptly likened to a machine, and it is said that every machine has a natural life, capable of doing just so much work, but after all our machine differs from an inorganic machine in the fact that it possesses the power of self-repair, and also that for a given time, say between birth and the twenty-fifth year, our machine increases in growth and efficiency; there is then another period, limited

* Carpenter, "Cyclopedia of Anatomy and Physiology," Vol. I, article "Age." "Hammond's Treatise on Hygiene."

usually between the twenty-fifth and thirty-fifth year, during which the living machine maintains its fullest development and resistance, probably because regeneration and waste are exactly counterbalanced, and then comes the period of decline, reaching from the thirty-fifth year to the extreme limit of human life, when this natural resistance begins to fail and the tissues are not regenerated as fast as they are broken down. (Hammond.)

The various periods in the life of man are marked by certain peculiarities, and exhibit susceptibility to some diseases and immunity to others.

Statistics show that out of every 1,000 children born alive, 188, or over one-sixth, perish before the completion of the first year. Of the twelve months during the first year of life the first month furnishes the highest mortality. This is due to the fact that a great many children, imperfectly developed at birth, die within a few days; the first month is followed by the second, third, and fourth month, probably, also, because of diminished vital resistance; next by the twelfth month. This jump from the fourth to the twelfth month is quite suggestive, as it is the usual period of weaning, with its attending danger from digestive diseases incident to artificial feeding.

During the second and subsequent years the mortality gradually decreases, and of children between the ages of 1 and 5 years there die annually about 37 out of 1,000, making a total loss during the first five years of 336 out of every 1,000 children born. If we stop to inquire into the immediate cause of the excessive mortality during the first twelve months, we find that about 40 per cent perish from diseases of the digestive system; about 21 per cent from affections of the respiratory organs; next in frequency are the infectious diseases like diphtheria, scarlet fever, measles, whooping cough, mumps, tubercular affections. Rickets, diseases of the nervous systems, convulsions, and inflammation of the brain and its membranes are also of common occurrence.

As the age of the child advances the body becomes more fully developed and better fitted to resist disease. The diseases to which the race is especially liable during the period extending from puberty to maturity, or about the twenty-fifth year, are those of the respiratory organs, tuberculosis, appendicitis, and typhoid fever. Thus of 500 cases of typhoid fever analyzed by me, 327 cases were between the ages of 10 and 25 years. It has been suggested that the undue prevalence of these diseases, as well as of mental and nervous affections during this period, may possibly be connected with a diminished power of resistance, the result of morbid sexual habits.

The diseases which are most frequently met with during the period of maturity, which ordinarily extends from the twenty-fifth to the thirty-fifth year of life, are consumption, gastric affections, and rheumatism.

The period of decline has been stated to embrace the thirty-fifth year to the extreme limit of human life. This is scarcely exact, as in the majority of instances we observe a period varying from five to ten years, during which the body remains at a nearly fixed point of development, before a disposition to degeneration is manifested. Indeed, during the first few years of actual decay the organism is so slowly affected that very little inconvenience results, and occasionally

individuals may withstand the tendency to degeneration to a very advanced period of existence.

The diseases to which the period of decline is especially liable are apoplexy and organic diseases of the heart and blood vessels, liver, and urinary organs. Gout and chronic rheumatism, pneumonia, bronchitis, and a variety of nervous affections are also very common; while malignant diseases, especially in the female after the cessation of the menstrual functions, are not infrequent.

We have not attempted to answer the question, quite often asked, why the body, after reaching a certain point of development, ceases to grow. A question equally interesting and difficult is, Why does the body, after reaching maturity, begin to degenerate? It has been said by Hammond:

> If it were possible to so adjust the repair to the waste that neither would be in excess, there is no physiological reason why life, if protected against accidents, should not continue indefinitely.

But as this, with our present knowledge, is impossible, we should at least direct our attention to the removal of the factors which heretofore have interfered with the average span of life allotted to us. We know that with the advance of hygiene the average human life has been lengthened from eighteen to twenty years in the sixteenth century to thirty-eight to forty years and over at the present time, and there is reason to hope that we may still further prolong our existence. While much has been accomplished in the past, more remains to be done, and one of the pressing needs is an enlightened system of dietetics.

A long series of investigations on tissue metamorphosis have been conducted by the Department of Agriculture—but are now interrupted for lack of funds—with a view of determining what substances are necessary to repair a certain amount of waste. We are extremely careful in other machines to use only those substances for the generation of force which are proper and no more than is absolutely necessary. In the human system little attention is paid to this question, and we eat without regard to the exact wants, and sooner or later disorganization results. Next, we want to be able to exercise all the organs of the body to that extent only which will insure their activity and the deposit of sufficient new material to keep them in a state of preservation, without leading to excess of the process of either regressive or progressive metamorphosis.

THE CAUSES OF DISEASE.

The direct and exciting causes of disease have been a source of much study. Thanks to the progress of medical science, the field is now limited to certain chemical, physical, mechanical, and vital agencies capable of producing definite alterations of the tissues and fluids of the body and manifestations of disease. Among the chemical causes we recognize: First. Those originating without the body of an organic an dinorganic character, commonly known as irritants or poisons, many of which have been referred to in connection with industrial pursuits. Second. Those originating within the body as a result of overeating, malnutrition, malfermentation, and other defects in the physiological functions of the body. Some of these, according

to Abbott,[a] include the ordinary end products, or waste matter of tissue activity, that have accumulated within the system as a result of defective accretory and excretory organs; while still others are the toxic products of malfermentations, often in operation within the alimentary tract. There is much reason for believing that the protein, when taken in excess in the food, undergoes putrefaction, and the absorption of these products gives rise to auto-intoxication by rendering the blood current impure. Herter, Comb, and others have shown that such a condition produces various maladies and milder forms of indisposition, and Metchnikoff considers auto-infection the chief cause of premature old age. Among the most frequent physical causes of disease are excessive heat, cold, and moisture,[b] while the mechanical causes include, of course, accidents and injuries of every description.

VITAL CAUSES.

By the term "vital causes" we understand certain living animal and vegetable parasites capable of reproduction in the body, and under favorable conditions of producing manifestations of disease. "It matters little whether the living organism is large or small, or belongs to the vegetable or animal kingdom, or whether it produces its effect in the skin, muscle, lympathics, internal organs, intestines, or in the blood, its introduction and reproduction constitute infection." (Sternberg.)

The writer does not pretend to differentiate between infectious and contagious diseases except to indicate that all contagious diseases are infectious, but not all the infectious diseases are contagious. Smallpox, measles, scarlet fever, German measles, mumps, and chicken pox are notable contagious diseases. Erysipelas, pneumonia, tuberculosis, glanders, and diphtheria, while not usually contagious, may become so under favorable conditions. Typhoid fever, cholera, yellow fever, and common suppuration are given by Abbott as examples of noncontagious infectious diseases.

THE PREVENTION OF INFECTIOUS DISEASES.

One great peculiarity of most of the infectious diseases is that they usually occur in groups, for it rarely happens that isolated cases of diphtheria, scarlet fever, measles, etc., develop unless special precautions have been taken to stamp out the first cases. Very generally a number of cases occur which can be traced to a common source of infection, and the disease may assume epidemic proportions. The question naturally arises, What constitutes an epidemic? In other words, how many cases are necessary before an infectious disease in a community with a given population can be said to be epidemic. Various answers have been given. The writer believes that a sudden and undue prevalence of any infectious disease may very properly be characterized as an epidemic. A disease is spoken of as pandemic when it spreads, like influenza for example, over a great extent of country—affects groups of several countries of the world generally. The term

[a] "Hygiene of Transmissible Diseases," 1890, p. 52.
[b] Kober's "Industrial Hygiene," p. 65.

"endemic" is applied to diseases that prevail in particular localities and are influenced by local conditions.

It is in the field of infectious diseases that hygiene has achieved, and doubtless will continue to achieve, its greatest triumphs, and there is ample room when we contemplate the frightful mortality from these diseases. Think of the fact that consumption, during the census year 1900, claimed 111,059 victims in the United States alone. Pneumonia caused 105,971 deaths, diarrheal diseases 46,907, typhoid fever 35,379, cholera infantum 25,576, influenza 16,645, diphtheria 16,475, croup 12,249, malarial fever 14,874, measles 12,866, whooping cough 9,958, septicemia 6,776, scarlet fever 6,333, cerebro-spinal meningitis 4,174. In order to appreciate the full significance of these figures we must consider not only the mortality, but also the number of cases treated. So, for example, the 35,379 deaths from typhoid fever in one year represent an annual prevalence of not less than 353,790 cases. The duration of a case of typhoid fever is not less than thirty days. If we calculate the average cost for care, treatment, and loss of work to be $300, and the average value of a human life at $5,000, we have a total loss of $283,032,000 per annum from one of the so-called preventable diseases.

We know that many of these diseases are preventable, and can at least, be checked, if not entirely stamped out. The decrease in the death rate from consumption in the United States since 1890 amounts to 54.9 per 100,000 of population. Diphtheria and croup, 52.5; cholera infantum, 31.9; diarrheal diseases, 19; typhoid fever, 12.5; malarial fever, 10.4; whooping cough, 3.1; scarlet fever, 2.7. Indeed, the average age at death in 1890 in the United States was 31.1; in 1900 it was 35.2 years.

"IF CERTAIN DISEASES ARE PREVENTABLE, WHY ARE THEY NOT PREVENTED?"

This very pertinent question was asked some years ago by the Prince of Wales, now King Edward, of England. Our answer is, while every scientific physician knows full well that if the methods of prevention recommended by sanitarians—including the prompt disinfection of the dejecta of typhoid fever patients, the expectoration and excretions of diphtheria, tuberculosis, and pneumonia patients—were adopted, these diseases would be reduced to a minimum, and probably eradicated in the course of a few years. The facts are, these recommendations have not been generally adopted because the knowledge gained by experimental medicine is not sufficiently diffused. Nor is the medical profession responsible for the fact that so many States still permit every charlatan to practice one of the most difficult and responsible of all professions, without a rigid system of examination. So long as we recognize and employ irregular and incompetent practitioners, so long will infectious diseases be spread as the result of ignorance and neglect.

The public should be made familiar with the nature and causes of infectious diseases, and be taught that many are a source of danger against which it is entitled to be warned. The health department should have competent medical inspectors and a clinical laboratory for the verification of the diagnosis. It should have the power, in

certain of these diseases, to display warning signs, to enforce isolation and disinfection, and to take such other steps in the way of prevention as may be deemed necessary to limit their spread.

Isolation to be effective should extend to all persons who have come in intimate contact with the patient. This is rarely enforced, except in smallpox, in the case of the wage-earners of the family, but it is clearly their duty to take special precautions in the way of clothing and personal disinfection.

Since our knowledge of the nature of infectious diseases has been more and more defined, scientific methods for their prevention have been applied. We have learned, too, that in addition to the germ there must be a suitable soil for its proliferation and that sanitation should not only destroy the environment for its development without the body, but also place the system in the best possible condition to resist its poisonous action. In the way of individual efforts, all measures which will improve the tone, nutrition, and vital powers of the system, many of which have been alluded to in the preceding pages, can not fail to render us less susceptible to infection. Nor should we underrate the importance of preventive inoculations, for it must be remembered that smallpox, for example, would continue to carry off one-tenth of the population and disfigure another tenth if it were not for the protective influence of vaccination.

The diseases which deserve special preventive efforts on account of their undue prevalence are consumption, pneumonia, scarlet fever, diphtheria, typhoid fever, diarrhea, and dysentery. During the prevalence of the last three diseases, and especially when the water is regarded with suspicion, the safest plan is to boil the drinking water and bring the milk to the boiling point. While the general rules of hygiene are necessary at all times, they are especially indicated during the prevalence of epidemics. A simple life, hope and courage, avoidance of excesses, of overwork, fear, and anxiety will serve to maintain a natural power of resistance to infection.

If in spite of all precautions, including, of course, avoidance of sources of infection, contagious diseases should gain a foothold in the family, the advisability of hospital treatment ought to be seriously considered. The advantages from every point of view are in favor of such a course, especially when we consider the danger of infection to other members of the family.

SICK ROOM, CARE AND DISINFECTION.

If the patient is treated at home, a bright, quiet, and cheerful room should be chosen, and promptly stripped of carpets and unnecessary furniture. It is in just such instances, when the importance of simple furniture, oiled or waxed floors, avoidance of draperies, dust and germ traps gain special significance. It is needless to insist that the room must be kept properly ventilated.

In the light of our knowledge it is certainly our duty to tell the family, in typhoid cases, that the infectious matter is contained in the excreta, and must be destroyed for the protection of others. In like manner we should not hesitate to inform a consumptive and his friends that the germs of the disease are contained in the expectorations; how they may be conveyed to others in coughing, kissing, and

dried sputum, and how they should be destroyed. And so we might go through the list of infectious diseases.

Scientific disinfection had its inception with the labors of Koch and Sternberg in 1880. Although certain physical and chemical agents were used empirically for ages, now we know, from laboratory experiments, that they are effective, because they destroy the vitality of the germs. We also know that in most of the contagious diseases the infective matter is given off by the patient chiefly through the secretions and excretions, and it is evident that disinfection to be of value must be directed to these and all the media with which the patient has come in contact.

A small gas stove near the sick room, and a 4-gallon wash boiler in which napkins, soiled linen, or clothing can be boiled, and thus disinfected before being laundered, will protect other inmates. The use of separate eating and drinking utensils, which can be boiled in a weak soda solution, is also a necessary precaution.

The refuse of meals should be placed in a covered vessel containing a disinfectant solution (1½ tablespoonfuls of lysol to 1 quart of water). A similar solution may be used to wipe the floor, furniture, and door knobs. Clinical thermometers, tongue depressors, and other instruments should be kept in a disinfectant solution and rinsed off in warm water before using.

The stools, vomited matter, expectorations, urine, blood and pus of infectious patients, especially those suffering from typhoid fever, dysentery, cholera, tuberculosis, pneumonia, influenza, diphtheria, and scarlet fever, should be placed in a covered vessel containing the germicidal solution to be hereafter described, the whole to be thoroughly mixed and allowed to stand for one hour before throwing the contents into water closets or privy vaults. Disinfection is also indicated in diseases like typhus fever, cerebro-spinal meningitis, smallpox, anthrax, glanders, and yellow fever; in the latter disease chiefly for the destruction of mosquitoes. It would also be well to resort to disinfection in all the early cases of measles, whooping cough, doubtful cases of fever, and diarrheal affections.

In diseases like smallpox and scarlet fever, in which the infectious agent is given off most likely from the surface of the body, occasional sponging with dilute chlorinated soda solution, 1 part to 9 of water, has been recommended, or the body may be anointed with some harmless antiseptic ointment; while during convalescence, i. e., just before the patient mingles with others, a corrosive sublimate bath, 3 drachms to 30 gallons of water, is indicated. Infectious corpses should not be washed, but enveloped at once in a sheet saturated with a 5 per cent solution of carbolic acid or bichloride solution, 2 drachms to a gallon of water.

All worthless articles should be burned. Metallic bodies may be sterilized by exposure to red heat or boiling. A good solution for soiled body and bed clothing is made of carbolic acid 3 parts, common soft soap 2 parts, and cold water 100 parts; they should soak for two hours, when they may be rinsed and sent to the laundry. Valuable clothing, mattresses, carpets, and draperies should be subjected to disinfection in a special apparatus furnished by the health department, and in the absence of such facilities they should be hung up loosely in the room and subjected to the influence of formaldehyde

gas, which has also been found the most effective agent for room and house disinfection after the recovery, death, or removal of patients, and is usually conducted by agents of the health office. A cheerful compliance with the rules and regulations of this service can not fail to be a benefit to the family and public at large. If such a department does not exist, it becomes the duty of the attending physician to see that the premises are properly disinfected. For this purpose it is necessary to make the apartments as nearly air-tight as possible, and to generate either formaldehyde by the combustion of wood alcohol or liberate it from formalin. The room must be kept closed for six hours after fumigation and it should then be thoroughly aired and exposed, when practicable, to sunlight, which is in itself a very efficient germicide.

The report of the committee on public health of the Medical Society, District of Columbia ("Washington Medical Annals," January, 1908), shows that there has been a marked reduction in the mortality of diphtheria, measles, and scarlet fever during the past ten years in the American cities, coincident with the establishment of municipal quarantine and disinfection. The average reduction in the mortality from diphtheria in 10 cities amounted to 24.4 per cent. While in this disease the use of antitoxin has served to accomplish the result, the reduction of 44 per cenf in the mortality from measles and a reduction of 70.8 per cent in the mortality of scarlet fever must be largely attributed to preventive efforts, including, of course, higher standards of living.

In this connection the early use of diphtheria anitoxin should be emphasized. The average diphtheria mortality, where antitoxin was used, in Chicago in 1902 was 6.48 per cent, and where not used it was 32.5 per cent; the mortality in children when used upon the first day was only 1.45 per cent, but when used later than the fourth day it rose to 14.49 per cent.

Space will not permit a detailed statement of other triumphs in preventive medicine, but the fact that, according to Surgeon-General Wyman of the Public Health and Marine-Hospital Service, there were during the last eight years 242,847 cases of smallpox with 6,067 deaths in the United States prompts the suggestion that every death from smallpox is a disgraceful reflection upon the intelligence of the age. This disease is entirely preventable by vaccination and proper revaccination. The statistics of England show that in the last half of the eighteenth century out of every 1,000 deaths from all causes 96, or nearly one-tenth, perished from smallpox. On the 14th of May, 1796, Edward Jenner introduced vaccination. During the period of optional vaccination the death rate fell from 200 to 41.7 per 100,000 of population, and from 1850 to 1898, during a period of compulsory vaccination, it fell to 5.3. In August, 1898, the "conscientiously believes" clause was inserted in deference to the anti-vaccinationists; 230,147 persons were exempted by the operation of the law, and in 1902 the rate rose in Scotland to 7.5, and in the United Kingdom to 6.1 per 100,000. The statistics of Prussia show that with the enactment of the revaccination law in 1874 the mortality has fallen to less than one-tenth per 100,000 of population, while the rate in the registration area in the United States is just 34 times greater. Indeed, it is claimed that Prussia would be entirely free from the

disease were it not for the importations from Russia and Austria. President Thomas Jefferson was instrumental in introducing vaccination in 1801 in the South, and in 1806, according to Harrington, wrote the following letter to Doctor Jenner:

> You have erased from the calendar of human afflictions one of its greatest. Yours is the comfortable reflection that mankind can never forget that you have lived. Future nations will know by history alone that the loathsome smallpox has existed and by you has been extirpated.

It is to be regretted that these prophetic words should not have been fulfilled in this country of progress and enlightenment. With the introduction of glycerinated animal lymph every vestige of prejudice against vaccination should cease, and compulsory laws should be enacted in every State, so that smallpox here, as in the German army, may become practically unknown. While quite a number of States have enacted laws requiring that unvaccinated children shall not be admitted to the public schools, the undue prevalence of the disease indicates that these laws are not rigidly enforced.

TUBERCULOSIS OR CONSUMPTION.

The total number of deaths reported as due to consumption in the United States during the census year of 1900 was 109,750, of which 53,626 were males and 56,124 were females. Statistics also show that the death rate from this disease in 1900 was highest in the District of Columbia. As a matter of fact, according to the records of the health office during the past thirty years, 14.5 per cent of all the deaths occurring in the District of Columbia have been caused by pulmonary tuberculosis. The death rate, however, has gradually and constantly improved and has fallen from 4.5 per 1,000 inhabitants in 1878 to 2.3 in 1907. This decline, we believe, is almost entirely due to improved methods in general sanitation and higher standards of living, which have increased the natural power of resistance to the disease. The decline in the death rate of the white race during this period has been from 3.3 in 1878 to 1.3 in 1907, and for the colored race from 6.9 to 4.5 during the same period. An emphasis is given to the comparison of the death rates of the two races when we realize that the average colored population of the District during the past thirty years was about 31.8 per cent of the entire population. In other words, 31.8 per cent of the population has furnished over 54 per cent of deaths from pulmonary consumption since 1878. There were 9,534 deaths from this disease during the past twelve years in this city—4,266 white and 5,268 colored.

Consumption not only leads the list of diseases in order of frequency and mortality, but the pecuniary losses entailed by the long duration of the disease and the danger to others from infection renders the subject of importance from an economic as well as medical point of view. If we assume the average duration of the disease to be two hundred days, and that $2 per day is expended for treatment, care, and loss of work, the 9,534 deaths in twelve years involved a total financial loss to the community of $3,813,600, or an average of $317,800 per annum.

The classical researches of Koch have established beyond a doubt that the disease is caused by the growth and multiplication in the

body of man or animal of a living microscopic organism or vegetable cell called the tubercle bacillus.

The mere introduction does not necessarily cause disease, as the system possesses certain defensive forces, and if the tissue cell happens to be stronger than the microbial invader no harm results. If, on the other hand, the conditions of the system favor the growth and development of the germ, little tumor-like knots are formed, known as tubercles or tubercular deposits. These, if formed in the lungs, may soften and break down and are coughed up. Heller calculates that 7,200,000,000 of bacilli may be expectorated in twenty-four hours by a single patient.

The disease most commonly affects the lungs, but may also affect the glands, intestinal and other internal organs; also the skin, mucous membranes, bones, joints, and the membranes of the brain.

The bacillus has been found in all tubercular deposits in man and animals, and the most frequent source of infection is conveyance from man to man, while the possibility of transmission from animals to man can not be ignored.

The germs may enter the system by the respiratory and alimentary passages, and by the skin and mucous membranes if there is an abrasion. The tubercle bacilli have not yet been demonstrated in the soil, water, or atmosphere, except in the immediate vicinity of a consumptive. Cornet demonstrated their presence in the dust of rooms and hospitals inhabited by consumptives in 40 of the 147 samples examined. Since the breath of tuberculous patients does not contain the germs, we may assume that, when found in rooms, they originate from the material coughed up by persons and carelessly expectorated upon the floor, walls, or carpet, which material, after drying, becomes a constituent of the household dust.

It has also been shown by the classical investigations conducted under Professor Fluegge that about 80 per cent of consumptives may in coughing, sneezing, and talking project into the air little droplets infected with tubercle bacilli, within a distance of 2 to 3 feet from the patient; and that these droplets constitute a source of danger, as they may be inhaled in a fresh and virulent state, especially if patients fail to guard against this mode of spreading by the use of handkerchiefs held before their mouths. It is believed that this mode of spreading infection also operates to a great extent in influenza and infectious catarrh of the respiratory passages, sore throats, diphtheria, etc. Fluegge, without wishing to exaggerate the danger from droplet infection, believes it to be greater than from the inhalation of infected dust. He very properly emphasizes the sources of infection from fresh dried sputum on floors, handkerchiefs, clothing, towels, etc., and it is perfectly conceivable that the germs may likewise be conveyed by small particles of sputum in kissing, in instrumental manipulations, or by adhering to eating and drinking utensils in common use. There is much reason to believe that the germs may be conveyed in clothing from carelessly expectorated sputum. Perlen tells us that of 4,177 tuberculosis subjects treated in the Munich Poliklinik, 709 were engaged in tailoring, cleaning, and shoe shops.

Tubercle bacilli have been found in the milk of tuberculous mothers and cows, especially when the lacteal glands were the seat of the disease or the system was infected with general tuberculosis; they

have also been found, under certain conditions, in the flesh of animals, and in the blood, feces, and urine of affected persons. Milk, cream, butter, ice cream, and dairy products may contain tubercle bacilli if the product is derived from an infected cow.

Professor Koch's views on this subject are in substance as follows:

1. The tubercle bacilli of bovine tuberculosis are different from those of human tuberculosis.

2. Human beings may be infected by bovine tubercle bacilli, but serious diseases from this cause occur very rarely.

3. Preventive measures against tuberculosis should, therefore, be directed primarily against the propagation of human tubercle bacilli.

His opponents, on the other hand, believe that the danger from the transmission of bovine tuberculosis is considerable, and infection by the intestinal route may not only produce tuberculosis of the bowels, peritoneum, and lymphatic glands, but also of the lungs. Much remains to be done, however, to determine the real degree of danger from bovine tuberculosis.

According to Doctor Salmon, during the year 1900, of 4,186,166 inspected cattle in the United States, 5,279, or 1 in 921, were tuberculous, and of 23,336,884 hogs, 5,444 were sufficiently affected to cause contamination of some part of the carcass. The writer has tabulated 86 cases of milk-borne tuberculosis, 3 accidental inoculations in man by the topical application of cream and milk, and 12 tuberculosis wound infections in veterinarians and butchers.

The possibility that the germs of tuberculosis may be carried by means of flies and dust suggests that greater precaution be exercised in the exposure of foodstuffs in show windows and markets. Other modes of infection, such as by the mucous membranes of the eye, genitals, wounds, and even through the unbroken skin, have been reported. There is little or no evidence to show that the disease is ever inherited, but we may assume that in children of consumptive parents we are dealing with the transmission of vulnerable anatomical elements, and this, together with the fact that they are constantly exposed to the germs, renders them peculiarly liable to the disease.

From what has been said it is evident that the tubercle bacilli are widely scattered; the modes of invasion are also numerous; and yet there is a certain proportion of those exposed who do not contract the disease. This shows that in addition to the germ there must also be a suitable soil for its growth and development. Such a soil is usually found in persons of feeble physique, victims of malnutrition, whose bodies have been weakened from any one or more of numerous causes, whether it be a previous attack of sickness, loss of sleep, dissipation, morbid habits, insanitary houses, lack of pure air, cleanliness, sunlight and outdoor exercise or of proper food.

Clinical experience indicates that faulty nutrition, debility, loss of blood, anemia, mental anxiety, diabetes, whooping cough, measles, and other diseases favor the development of tuberculosis. We also know that a predisposition may be inherited, as evidenced by a delicate physique, narrow chest, and general vulnerability of the tissues. A vulnerability of the tissues to the disease may also be acquired by dust-producing occupations, and here the amount of dust seems less important than the character of the particles which compose it. For this reason, no doubt, the hard, sharp, and angular particles of iron

and stone dust are more liable to produce injuries of the respiratory passages, thus favoring the invasion of the bacilli.

Uffelmann believes that what we call inherited or acquired predisposition to tuberculosis may amount, in many instances, only to a local susceptibility of the respiratory passages, a weakness of the membranes, and greater vulnerability, and refers to the fact that some individuals, otherwise healthy, show a greater liability to laryngeal and bronchial catarrhs, and later to tuberculosis, whilst in others repeated attacks of tonsilitis predisposes to diphtheria.

The observations of Doctor Bowditch, of Boston, and Doctor Buchanan, of England, indicate that damp soils and habitations are important predisposing causes to tuberculosis, and we know positively that a decided reduction has been observed everywhere coincident with the introduction of sewers. The only reasonable explanation is that sewers have helped to purify the air, and rendered otherwise damp soil and houses dry and more healthful. It is well known that a damp soil is liable to make a house damp by a capillary attraction, and the injurious effects of damp air have already been pointed out on page 104.*

As in other infectious diseases, the question as to whether the germs are introduced directly, and in sufficient numbers, is of importance. The observations of Humphrey, Pollock, and Leudet conclusively show that in well-ventilated wards of chest and consumption hospitals the disease is not usually found to spread. In private practice the results are different. A French committee of investigation presents 213 cases of tuberculosis in which the communicability of the disease was clearly established. In 64 of these cases the disease was conveyed from husband to wife; in 43 from the wife to the husband; in 38 it was transmitted to brothers or sisters; in 19 from parents to the children; in 16 to distant relatives; and in 32 to outsiders. The communicability was most marked among the poorer classes. Another collective investigation, by a German medical society, revealed the fact that of 938 married persons who died of acquired tuberculosis, in 101 instances either the husband or the wife also contracted the disease. In 8.1 per cent of these cases the husband contracted the disease from his wife, and in 13.2 per cent the wife was infected from the husband. Other statistics might be adduced in favor of the communicability of the disease, but Zasetzky's observation is of special interest. He reports the case of a tuberculous woman who married, between 1872 and 1883, 3 husbands, all previously healthy; the first husband died in 1879 of tuberculosis; the second in 1881, and the third husband, at the time of the report in 1884, was also a victim of the disease, the wife in the meantime having died of consumption.

We can only explain the greater contagiousness in such cases by a more intimate contact, the occupation of the same room and bed, common use of eating and drinking utensils, mouth to mouth contact, and the vitiated and infected air of private rooms.

EARLY SYMPTOMS OF CONSUMPTION.

The early symptoms are by no means clearly defined; we have, however, a steady loss in weight, with a slight amount of fever,

* Kober's Industrial Hygiene.

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especially in the afternoon or evening; the heart's action is quickened upon the slightest exertion, there is a general feeling of progressive weakness, with loss of appetite or disturbed digestion. There may or may not be a cough in the early stage of the disease. The symptoms referred to are sufficiently serious to call for the advice of a physician, and should never be neglected. Every child should learn to know that prompt treatment in the incipient stage offers the best chances for recovery, and that by proper care 80 per cent may be permanently cured.

Consumption is a curable disease, and the chief remedies, such as fresh air, wholesome food and living quarters, suitable clothing, systematic bathing and hardening of the skin, are also the best preventive measures. Patients should not waste money on patent medicines or advertised cures for consumption. No reputable physician ever advertises his skill, and persons unable to pay for medical services will always find competent men at the dispensaries.

PREVENTION OF TUBERCULOSIS.

The facts presented in the foregoing pages justify the following conclusions:

1. Tuberculosis is an infectious disease caused by a microbe, transmissible to healthy persons under certain favorable conditions.
2. Inherited and acquired predisposition play an important rôle in the invasion and multiplication of the bacilli.
3. The germs may enter the system by the respiratory and alimentary passages, and by the skin and mucous membranes, if there be an abrasion.
4. While the bacillus may be transmitted through the milk, flesh, and blood of animals and man, the most common and effective way of distributing the disease is by the sputum and droplets of tuberculous patients.
5. The habitations of consumptives as well as their personal effects, clothing, etc., are infected and liable to convey the disease to others.

Space will not permit me to consider in detail the measures for the prevention of this disease, but I desire to emphasize a few which may be resorted to in the control of the sources of infection and the diminution of the predisposing causes:

1. Compulsory notification of cases to the health authorities as soon as the disease is recognized. This is of vital importance for the location and control of the sources of infection, and for the protection of the family and others. It has been urged that the depressing effect of such information would be too great for the patient, but this will surely be counterbalanced when we inform him that it is a curable and preventable disease, and that his chances for recovery are especially favorable if he does not reinfect himself.

The health authorities, apart from distributing proper printed directions for the use of the family and the patient, as regard the care, disinfection of sputum and avoidance of droplet infection, should also resort to disinfection of the home and personal effects, especially upon the death of the patient or vacation of the premises. It is a good plan to receive the expectoration into paper spitting cups, paper napkins, or moist saw dust, which should be burned. Cuspidors should contain a carbolic acid solution (6 ounces to a

gallon of water). The patient, when outdoors, should use pocket spitting flasks, and during coughing or sneezing hold a handkerchief over mouth or nose. Under no circumstances should patients spit into spaces where the expectoration may be dried, and as pulverized dust, gain access to the air. The same directions about disinfection apply to cases suffering from pneumonia, influenza, and diphtheria. The public should not cultivate an exaggerated fear of such cases, but has a right to insist upon clean and decent precautions.

2. The enactment and enforcement of laws against promiscuous expectoration and coughing into the faces of persons where the sputum is liable to infect, and provisions for suitable spittoons and their proper disinfection in all public places are called for. The streets should be sprinkled and swept at night so as to reduce the inhalation of germ-laden dust to a minimum.

3. The supervision of the sanitary condition of hotels, theaters, churches, schools, ambulance service, sleeping cars, etc., should likewise be under the control of the health department, and house-cleaning should be accomplished as far as practicable by the vacuum system.

4. Marriage with a tuberculous person should not only be discouraged, but absolutely prohibited by law. A tuberculous mother should not nurse her infant, and in the selection of a wet nurse a certificate of health should be demanded.

5. Isolation of tuberculous patients should be insisted upon in hospitals, asylums, and public institutions. In private life the patient should occupy at least a separate bed, use separate eating and drinking utensils, and neither receive nor give kisses.

6. Government inspection of dairies and of dairy and meat products, and the extermination of bovine tuberculosis, are called for. Until this is accomplished or as an additional precaution, milk should be heated to 150° for ten minutes, cooled quickly and kept cold, and all meats should be well cooked.

Having considered the sources of infection and the indications for their control, it is well to refer to what may be done towards diminishing the predisposing causes to consumption. Many of these questions have been considered under personal hygiene, habitations, ventilation, food, alcohol, tobacco, clothing, bathing, etc., and it remains to sum up the duties of the state in this direction.

Reference has already been made to the good effects of sewers in preventing air pollution, and in the removal of dampness by drainage. When we recall the influence of sewers upon the prevalence of the disease, and remember that only about 30 per cent of the population in the United States live in sewered towns, and about 41 per cent live in towns having public water supplies, we see at once the necessity that a system of public sewerage should go hand in hand with the public water supply. The neglect on the part of the State not only increases the dampness of the soil, but compels recourse to the various makeshifts for the collection and removal of excreta, and leads to pollution of the air, soil, and water.

INSANITARY DWELLINGS.

The influence of insanitary dwellings on the prevalence of tuberculosis has already been emphasized. In addition to what has been

said on page 104,* it should be remembered that the tubercle bacillus clinging to floors and walls in carelessly expectorated sputum or droplets would be destroyed by a few hours of sunlight, but finds in damp and gloomy rooms a suitable environment for its vitality and growth; and the other insanitary factors, alluded to vastly increase the susceptibility to the disease. For all these reasons I consider the condemnation of houses unfit for human habitation and substitution of sanitary homes only second in importance to the destruction of the germs.

The State may not be in position to provide sanitary houses, but it can at least regulate and supervise the construction of all new houses with reference to the exclusion of dampness, sanitary plumbing, amount of air space, light, heating, and ventilation of dwellings, and clearly define what constitutes an insanitary tenement, offered for rent, and provide a suitable penalty. The State should also interdict the erection of tall buildings, and of all buildings covering over 66 per cent of the lot, since they shut out light and air, thus destroying the very object for which broad streets and avenues were created, and bringing us back to the insanitary era of the medieval towns with their narrow and winding streets.

PHYSICAL CULTURE, PUBLIC PLAYGROUNDS, AND BATHS.

The State should pay attention to the physical development of our youth, and this is best accomplished by proper training, preferably in the open air, in connection with the public schools and playgrounds. The children of consumptives require special attention because of the transmission of vulnerable anatomical elements which render them peculiarly liable to the disease; this predisposition may certainly be overcome, in addition to proper food, by pure air, methodical gymnastics, and systematic hardening of the skin secured by bathing, and no school should be without these hygienic advantages. If it be found that school children are starving for want of food it is clearly our duty to make suitable provisions to prevent permanent dependency. No effort should be spared to increase the resisting power of the individual. Indeed, we are altogether too apt to underrate the question of soil or predisposing factors in our crusade against the disease.

There is abundant statistical material to indicate the influence of dust-producing occupations as a predisposing factor to tuberculosis and other pulmonary diseases, and it is clearly the duty of the State to formulate efficient laws in regard to factory sanitation and the occupations in general which are injurious to health.

It is certainly the duty of the State to see that every patient who has no home, or whose environment offers less favorable conditions for his recovery, is provided with proper care and shelter. It may be truly said that hospital treatment of consumptives offers the best chances for recovery and the ultimate extermination of the disease, and the State, until a comprehensive system of industrial insurance has been adopted, must shoulder the responsibility in the case of patients unable to bear the financial burdens. Every city of any size should provide facilities for the isolation and proper treatment of

* Kober's Industrial Hygiene.

the patients, supplemented by general state sanatoria. Since the identification of the disease is the first and most important step in its treatment and prevention, the establishment of dispensaries for the recognition of incipient cases among the dependent classes seems urgently called for. Such dispensaries should become the feeders for municipal and state sanatoria, and when properly conducted, with special reference to social service, will be a most important factor in the combat against tuberculosis. In all such cases it is desirable to sift charity from abuse; and it devolves upon the State to determine the financial condition of the applicant and also prevent destitution of the family while the breadwinner is incapacitated for work. It is also the duty of the State to suppress quackery, for no class falls more readily a prey to unscrupulous mountebanks than our consumptives.

The Federal Government is already performing an important duty by exercising a watchful care over the subject of tuberculosis among animals. The preventive measures urged by the Bureau of Animal Industry are of far-reaching significance, although primarily intended to protect the pocketbooks of our farmers and stock raisers. Large sums are annually, and very properly, expended to quarantine our seaports against cholera, yellow fever, and smallpox, because these diseases, if permitted to gain a foothold, occur in epidemics, are rapidly fatal, and hence strike terror into a community. It is to be hoped that similar opportunities will be afforded the public-health service to cope with tuberculosis, which claims more victims than all these diseases combined.

In the actual care and treatment we also have a right to expect a more active participation on the part of the Federal Government. It is a notorious fact that thousands of helpless cases of consumption are annually dumped upon our States and Territories which have become famed as health resorts; and the hospitals, sanatoria, and almshouses of the Carolinas, California, Colorado, Arizona, and New Mexico are filled with indigent dying consumptives.

It is claimed by Mr. Frank D. Witherbee, in "Charities," November 6, 1904, that in Phoenix, Ariz., public and private charity is taxed to the uttermost, and that three-quarters of the money expended on the inmates of the almshouses goes to alien consumptives. It is cruel and worse than useless to send a consumptive away from home without sufficient means to secure the ordinary comforts and advantages of climatic treatment, and the Federal Government should not tolerate it. But until this is prevented, the Public Health and Marine-Hospital Service should be authorized to study the problem, which studies may form the basis for a more permanent and enlightened amelioration of the sufferings of this unfortunate class of victims.

It is very evident that the great problem which confronts most of our sanatoria to-day is, What shall be done with the class of indigent patients whose disease has been arrested, but who need suitable employment and surroundings for their permanent recovery? While it is hoped that the opportunities of a cooperative system will broaden out in time in connection with the State sanatoria, it can not be denied that certain sections in the Far West offer suitable advantages for a permanent cure, and the question arises whether the Federal

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Government would not be justified in engaging in extensive live-stock raising and employ young men of this class to do the work? The Government needs horses and mules, beef and mutton, butter and dairy products for the public service. It has many valuable reservations, susceptible of cultivation with or without reclamation, and there is no good reason why such government farms should not prove self-supporting.

The results of the government sanatoria for consumptives at Fort Bayard, Fort Stanton, and Fort Lyons have been so gratifying that substantial and permanent results may be hoped for by an expansion of the system to at least the civilian employees of the Government, along the lines indicated, or by the establishment of colonies for arrested cases.

PNEUMONIA.

Pneumonia ranks next in frequency to consumption as a cause of death. During the census years of 1900 there were 105,971 deaths from pneumonia in the United States.

The records of the health department show that during the past twelve years there were 5,947 deaths from this disease in the District of Columbia, 2,632 white and 3,315 colored.

The undue prevalence of pneumonia and tuberculous diseases of the respiratory system is general. The colored population shows a peculiar susceptibility, which is, in all probability, caused by environment and sociological factors rather than by racial differences. At all events, an attempt will be made, on page 210, to account for the undue mortality among our colored population.

Pneumonia, like tuberculosis, is an infectious disease, and is caused by a microbe, first discovered by Gen. George M. Sternberg in 1880, and subsequently demonstrated to be the essential factor in the causation of the disease. This germ, known as a micrococcus, is found in a considerable number in the mouth and saliva of perfectly healthy subjects, and in very great numbers in the phlegm which fills the air cells of the affected part of the lung, and is coughed up during the disease in the form of rusty sputum. The rusty appearance is due to the presence of blood corpuscles issuing from highly inflamed lung tissue. The danger in pneumonia depends upon the extent of lung tissue involved, the amount of toxins generated and absorbed, the condition of the heart and kidneys, and the general power of resistance of the patient.

In the causation of the disease we are evidently dealing with several factors, viz, the presence of the micrococcus, individual predisposition, and an exciting cause. Since the germ has been found in the mouths of perfectly healthy persons, and was, in fact, discovered by General Sternberg in his own saliva, we may conclude that the invasion of the microbe alone is not sufficient to produce the disease. If, therefore, an attack of pneumonia results, the patient must have furnished a suitable soil for the rapid multiplication of the germs, and the structural changes which are brought about by their agency. As in tuberculosis, so in this disease debilitating factors and depressing influences, such as malnutrition, alcoholism, and insanitary surroundings, are important predisposing causes. But, in addition to all this, there must be an exciting cause. A careful study of the sea-

sonal prevalence shows that pneumonia, like tuberculosis, bronchitis, and congestion of the lungs, is very much influenced by temperature, humidity, and prevailing winds. The following chart of the health department shows deaths from pneumonia during 1906, arranged by months, compared with the average monthly deaths for the past ten years. This chart shows that the disease is especially prevalent during the colder months of the year, and reaches a minimum in June, July, August, and September. It is well known that cold, and especially damp cold, winds, are often the cause of catching cold, probably because they abstract bodily heat in proportion to their velocity, and if this takes place to an unusual degree, or with great abruptness, the capillaries of the skin contract, the blood is driven into the internal organs, and congestion results, usually in the weakest spot. As an additional effect of sudden changes in temperature, we have the suppression of the cutaneous function and consequent retention of effete matter in the blood. We can readily appreciate how all this may be aggravated by the habitual presence of alcohol in the blood current, which diminishes oxidation of the waste products, and also by overcrowding, because the effect of deficient air supply is not only to reduce the quantity of carbonic acid by expiration, but also to diminish the normal oxidation of effete matter. In any event, the conditions referred to favor the accumulation of effete matter, render the blood current sufficiently impure to lose its germicidal properties, and thus constitute a suitable fluid for the rapid multiplication of the pneumococcus invader. It is also evident that other depressing influences, such as previous illness, especially an attack of measles or of influenza, vastly increase the vulnerability of the tissues and chances of infection.

This disease is doubtless communicable from sick to well persons, as shown by the occurrence of epidemics in prisons, institutions, etc.; indeed, its infectiveness is no longer a matter of doubt, and calls for prompt disinfection of the sputum and avoidance of close contact, in the manner already described in the care of tuberculous patients.

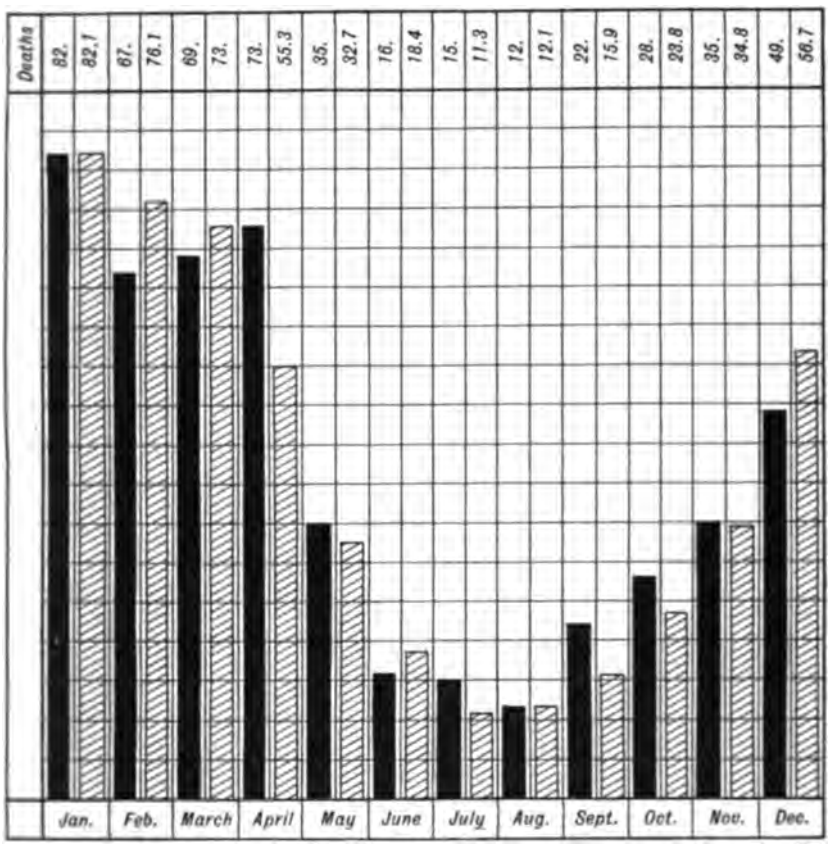
While precautionary measures for the destruction of the germs are of great importance in stamping out the sources of infection, our aim must also be directed toward the correction of predisposing and exciting causes. This we can do by clothing adapted to climate and seasons, proper housing conditions as regards heating and ventilation, proper food, and temperate habits. The disease, unfortunately, is increasing in this country, and the increase is doubtless influenced by the increased consumption of alcohol. We have already emphasized the fact that pneumonia is vastly more fatal among the topers.

We may also lessen the harmful effects of abrupt changes in temperature by systematic hardening of the skin, remembering always that a normal function of the skin depends largely upon cleanliness, and a proper tone of the cutaneous vessels and nerves, secured by bathing.

INFLUENZA (LA GRIPPE).

Influenza or epidemic catarrh is also an infectious disease, caused by a very small bacillus, discovered by Pfeiffer in 1892. This organism is constantly found in the bronchial and nasal secretions of the affected persons, and, as in tuberculosis and diphtheria, is largely dis-

MONTHLY DEATHS FROM PNEUMONIA DURING 1906, COMPARED WITH AVERAGE MONTHLY DEATHS FOR PAST TEN YEARS.



■ *Deaths from Pneumonia during 1906, by months.*

▨ *Average deaths from Pneumonia, by months, for 10 years.*

Reproduced from the Report of the Health Officer, District of Columbia, 1907.

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seminated by close contact with the sick. The disease often assumes pandemic proportions, because all ages are susceptible to infection, and no precautions are taken to guard against its contagious nature. As early as 1173 the disease is reported to have appeared in different parts of Germany, Italy, and England, and since then over 60 epidemics have been recorded, of which 15 were very extensive. The disease in the United States was first recognized in New England in 1627, and a number of epidemics, notably those of 1807, 1815, 1824, 1847–48, 1851, 1857–58, 1874–75 have been recorded. The most extensive epidemic occurred in 1892 to 1897, and during the census year 1900 there were no less than 16,645 deaths from the disease in this country. During the past twelve years 808 deaths were reported in the District of Columbia. It is by no means a trivial affection, as it carries off a number of persons, chiefly from pneumonic complications, and wrecks the health of many more by affections of the nervous system, heart, kidneys, eyes, and ears. In the prevention of the disease the same general rules which have been urged in tuberculosis and pneumonia are clearly indicated.

TYPHOID FEVER.

Typhoid fever carries off annually over 35,000 victims in the United States. According to the records of the health department, there were during the ten years ended December 31, 1906, 1,693 deaths (968 white and 725 colored) from this disease in the city of Washington. Based upon an estimated mortality of 10 per cent, it is within reason to assume that there were not less than 16,930 cases during the same period. If we calculate the average cost for care, treatment, and loss of work to be $300, and the average value of a human life $5,000, we have a total loss in the vital assets of this community of $13,544,000 from one of the so-called preventable diseases.

Typhoid fever is essentially a filth disease, caused by a specific bacillus, which is constantly found in the intestinal discharges, and almost always in the blood and urine of typhoid fever patients. The invasion of the microbe most likely takes place through the alimentary tract, as evidenced by the location of the disease in the intestines, and the frequent dissemination of the germs through the water and milk supply. The possibility of transmission through the air should not be excluded, for, as in tuberculosis, so in this disease the infectious material may have become dried and pulverized, and with particles of dust may gain access to the food or the mouth, there to be swallowed or inhaled.

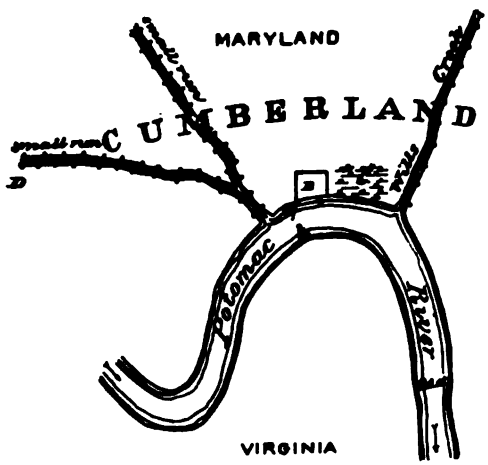
The principal source of transmission, however, is through the water supply, infected milk, food, and infected hands. In all such instances the virus proceeds primarily from the stools and urine of typhoid patients, and gains access through sewers, or otherwise, to the water supply, or contaminates vegetables and fruit which are eaten raw, through the medium of night soil or washing them with infected water. Milk and food may be contaminated by washing the utensils with infected water or by handling it with unclean or infected fingers. The writer, in his investigation of the typhoid-fever situation in 1895, also pointed out how flies may carry the germs on their feet, from typhoid stools and infected sources, to the food and

milk supply. There is special danger from infection of the fingers in handling or washing soiled patients, or their clothing, bedding, and utensils, as the germs from the soiled parts may cling to the fingers and be conveyed to the mouth during eating, or infect the food and milk of others in handling it, unless the hands have been thoroughly washed after every unclean act. Moreover, it has been shown within the last ten years that some persons after recovering from typhoid fever may continue to carry the germs and spread them through the urine and feces, although the persons themselves apparently enjoy good health. From the statistics of Lentz, Klinger, and V. Drigalski, Goldberger estimates that about 3 per cent of typhoid-fever patients become "chronic bacillus carriers," and thus constitute an important source of infection, chiefly in handling milk and food. Those who are familiar with the average dairy employee or cooks will have no difficulty in surmising how the fingers may become infected by careless toilet habits. Indeed, it is very evident that the Mosaic law of ablution of the hands after every unclean act can not be too strongly urged in the light of our knowledge concerning the transmission of disease germs.

Notwithstanding the different modes of dissemination of the germs, it should be remembered that typhoid fever is a typical water-borne disease. The infection of a water supply is either direct or indirect; the former includes all instances where the water is contaminated by specifically infected sewage emptied directly into the river or lake, or by excreta deposited along the banks, which sooner or later are washed into the water supply. By indirect infection we understand those instances in which the excreta, or wash waters, have been deposited in or upon the soil, and by percolation finally reach wells, springs, or other bodies of water.

That the excreta from a single typhoid patient have infected the water supply of a whole community has been shown in connection with the epidemic at Cumberland in 1889, the history of which shows that there were no cases of typhoid fever in that town until the discharges from a young man, who returned from Ohio in December, quite sick, found their way into the public water supply. This case died December 20. The next case appeared January 10, 1890, and within a short time 485 cases developed in a population of 1,200. Every case but one was traced to polluted river water. The accompanying chart shows that the epidemic resulted in the highest typhoid mortality rate ever reached in this city, viz, 104 deaths in every 100,000 of the population.

The typhoid fever epidemic at Plymouth, Pa., which affected over 1,100 persons, and began April 9, 1885, was traced to a case who contracted the disease elsewhere, returned to his home in January, 1885, and was for many weeks quite ill. The dejecta from this case was thrown along the sloping banks of a mountain stream, where they remained innocuous upon the snow and frozen ground until some time between March 25 and April 1, when thaws set in. Under the influence of this thaw they were washed into the mountain stream and carried into the reservoir which supplied the town with water. There is every reason to believe that the typhoid fever germs were distributed in the water between March 28 and April 4 or 5. The first case was reported April 9. During the week beginning April 12



Dots represent privies.
B represents Water-Works.
C " garbage-lot, with pigs feeding.
D " house where first case appeared
1 Supply-pipe supposably closed
2 " " " open.

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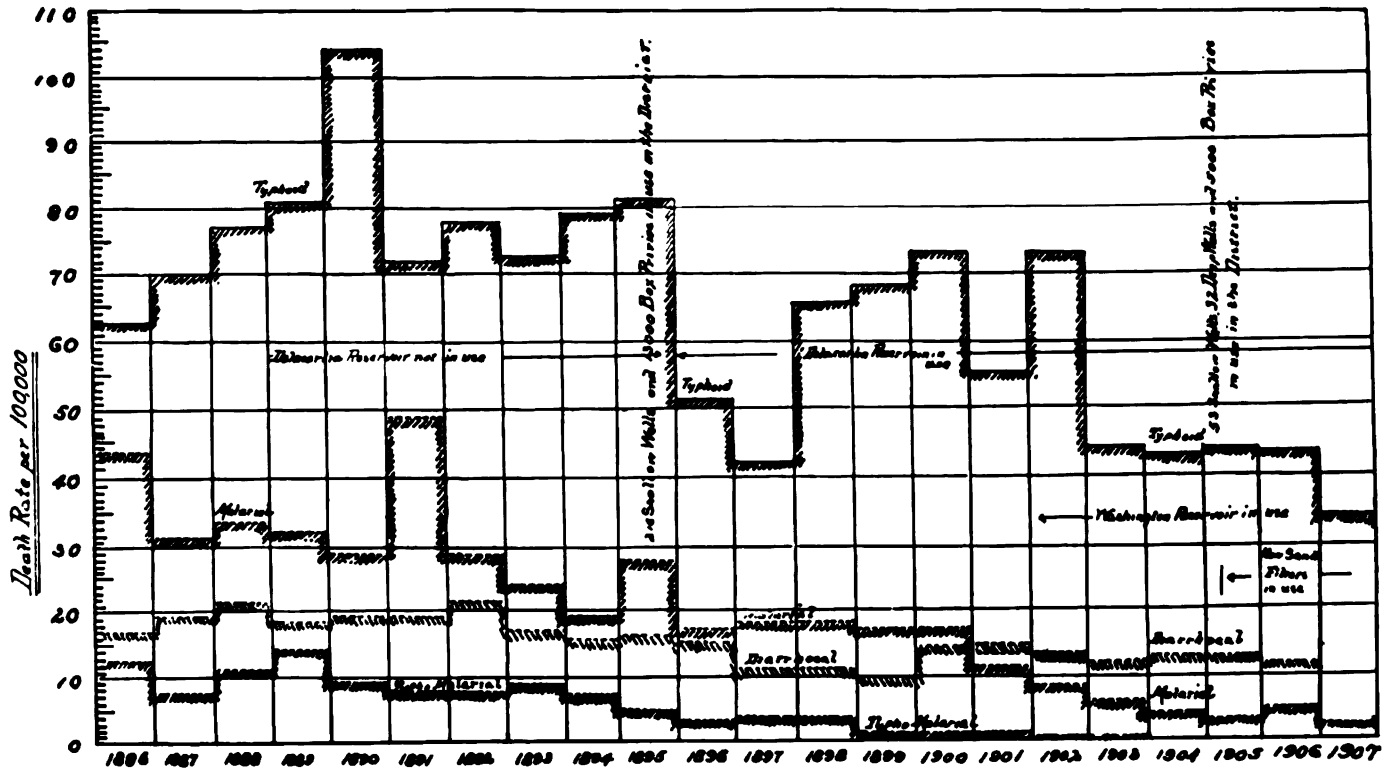
EFFECT OF WATER PURIFICATION UPON DEATH RATES FROM TYPHOID FEVER, MALARIAL AND DIARRHEAL DISEASES IN WASHINGTON, D. C., PER 100,000 OF POPULATION.



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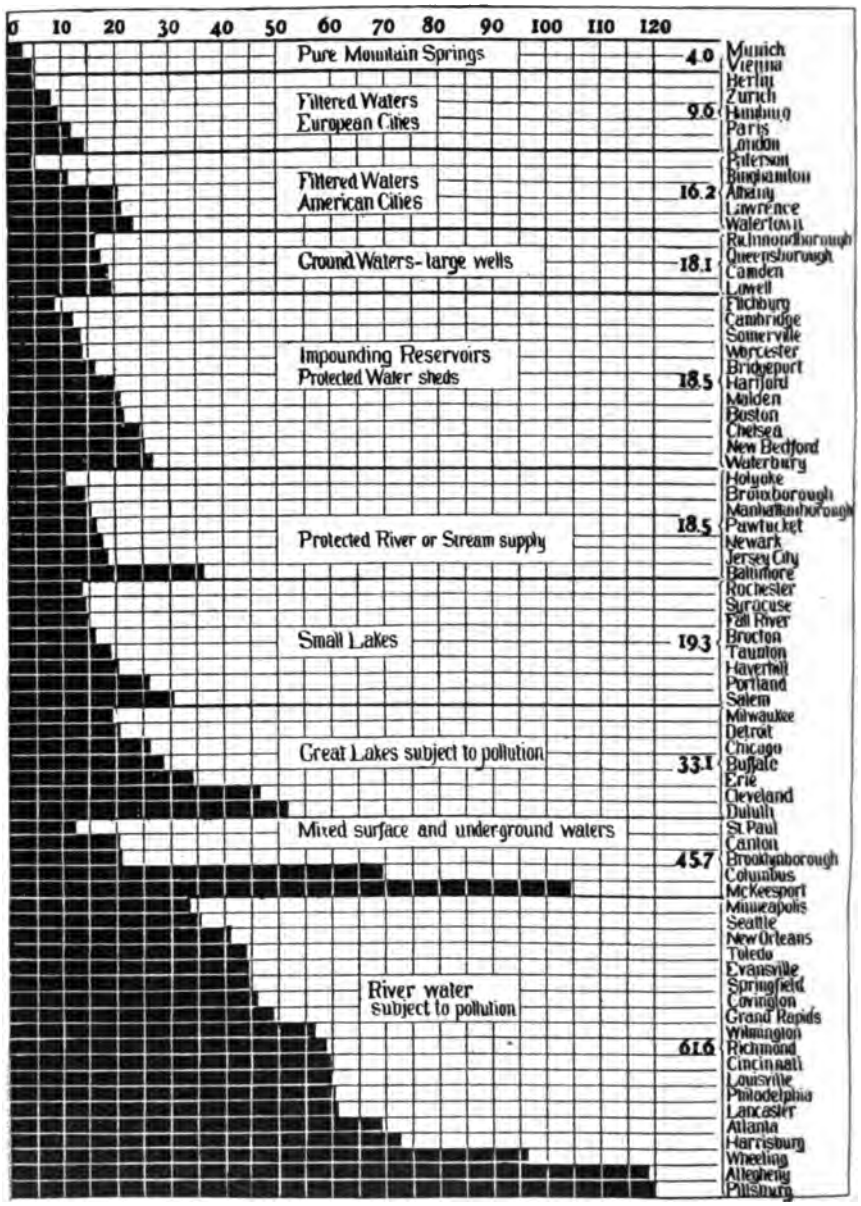

MEAN DEATH RATES FROM TYPHOID FEVER, 1902 TO 1906, IN 66 AMERICAN CITIES AND 7 FOREIGN CITIES. GROUPED, AFTER FUERTES, ACCORDING TO THE QUALITY OF THEIR DRINKING WATER. THE RATES FOR FOREIGN CITIES ARE TAKEN FROM JAMES H. FUERTES.

from 50 to 100 cases appeared daily, and on one day it is said that 200 new cases were reported.

Such instances might be multiplied by the hundreds; we have simply to recall the epidemic at Ithaca, N. Y., during the months of January, February, and March, 1903, affecting 1,350 persons in a population of 13,000, with 78 deaths, among them 128 students at Cornell University, with 26 deaths. The epidemic at Butler, Pa., in the same year, affecting 1,348 persons with 111 deaths in a population of 18,000; the epidemic at Columbus, Ohio, in 1904, with 1,640 cases and 166 deaths in a population of 140,000; and the more recent epidemic of Scranton, in 1906–7, with 970 cases and 77 deaths, are other shocking examples of water-borne typhoid.

INFLUENCE OF WATER SUPPLIES UPON TYPHOID FEVER.

Sanitarians are so convinced that a pure water supply is incompatible with a high typhoid fever rate that they unhesitatingly declare, "Show me a city's statistics of the disease and I will tell you the character of its water supply." The writer, in a paper on "Conservation of life and health by improved water supply," presented a number of diagrams showing the typhoid fever rate in a number of cities, classified according to their water supply, of which plate 7 is here reproduced.

This diagram also conclusively shows that the European cities which do not only prevent pollution of rivers, but also filter their water, enjoy the lowest typhoid fever rates. In the same paper the writer has shown that in seven American cities the reduction in typhoid fever, after the introduction of pure water, amounted to 70.5 per cent, and that during the past twenty-five years the death rate from typhoid fever in 14 countries and cities, tabulated by him, has been reduced 54.3 per cent. The Bulletin for the month of April, 1908, of the New York State department of health shows that the death rate from typhoid fever in 10 cities of that State has been reduced 53.4 per cent by an improved water supply.

CAUSES OF TYPHOID FEVER.

The writer has heretofore held that about 50 per cent of the cases are water borne (well, river, commercial, and ice), and has taught for years that wells in this city, on account of soil pollution, should not be tolerated, and that the only way to render a suspicious supply safe for drinking purposes was to boil the water. The danger from Potomac water since filtration, has been practically eliminated, but ice should not be mixed with it as it may be as impure as the water from which it is derived. Moreover, iced drinks and foods are also objectionable on account of the injury to the digestive functions, especially in the summer months, unless sipped very slowly, and, upon general principles, ice cream should be made with sterilized cream.

In the writer's report on typhoid fever for 1895, he urged as a preventive measure the boiling of milk, and the systematic inspection of dairies. This, together with the fact that he has tabulated 195 of so-called milk-borne typhoid epidemics, clearly indicates that in his judgment milk is to a certain extent responsible for the dissemi-

nation of the disease, probably in about 15 per cent of the cases. In 148 of the 195 epidemics analyzed by him there is evidence of the disease having prevailed at the farm or dairy. In 67 instances it is probable that the infection reached the milk by soakage of the germs into the well water with which the utensils were washed, and in 16 instances the intentional dilution with polluted water is a matter of evidence. In 7 instances the infection is attributed to the cows wading in sewage-polluted water and meadows, and it is quite conceivable that the germs clinging to the udder and teats found their way into the milk. In 4 instances the infection was spread through cream prepared in infected premises. In 7 instances through creameries. In 1 instance the milk tins were washed with the same cloth used among the fever patients. In other instances the germs were probably carried into the milk by flies passing from the infected excreta. In 24 instances the people handling the milk also acted as nurses. In 10 instances patients while suffering from mild attacks, or during the first ten days of their illness, continued at work. From what has been said of the danger of soiled hands, we may assume that the germs in all such instances may be conveyed in the manner already explained.

In like manner a "chronic bacillus carrier" may convey the germs by soiled fingers into the milk. This mode of infection was strongly suspected ever since Doctor Soper, of New York, traced a number of household epidemics to an infected cook,[a] and also by a very interesting instance reported by Dr. Henry Albert, occurring in the fall of 1907, at Cedar Falls, Iowa. The possibility of spreading the disease by such a carrier has been materially strengthened by a study of a milk-borne typhoid epidemic in this city in October, 1908. Surgeon-General Wyman's report says:

> Twenty-six cases of typhoid in Georgetown, occurring between October 8 and 15, were traced through the milk to the dairy farm. On close inspection of this dairy farm no case of typhoid fever for years could be found to have occurred among any of the employees, nor was any other source of infection discovered until after a systematic examination of dejecta of all the employees had been made in the hygienic laboratory.
>
> This examination developed large numbers of typhoid bacilli in the dejecta of one woman who had had typhoid fever eighteen years before, and was one of the milkers of the dairy. Persons thus affected are known to the medical profession as typhoid bacilli carriers, but this is the first considerable outbreak of typhoid in the United States traced through milk to such a carrier, excepting the case reported by Dr. Henry Albert, of Iowa, in the "Hygienic Laboratory Bulletin," on "Milk and Its Relation to the Public Health," published last January.
>
> The case just discovered is deemed of special interest to health officers in their endeavors to trace the source of typhoid outbreaks when that source seems to be obscure. At least 2 per cent of all recovered cases of typhoid fever become bacilli carriers for a longer or shorter period, even while enjoying good health. Ten per cent of the cases of typhoid fever in Washington during the past three years have been definitely traced to infected milk.

This instance is of extreme interest and certainly suggestive of danger, but scientific critics may be tempted to ask: (1) If this woman was the only possible source of infection, why did she not infect the consumers of the milk before? unless, indeed, it can be shown that she had a recent reinfection; (2) were the typhoid fever germs actually found in the milk? (3) if not, why was there no effort made to

[a] "Journal American Medical Association," Vol. XLVIII, No. 24, p. 2019.

demonstrate experimentally that this woman with the careless toilet habits could infect her hands and through it the milk? and (4) have all other local sources of infection in Georgetown been effectually eliminated?

The evidence on milk infections shows how important it is for us to bring our milk to the boiling point (scalding), which will kill the germs. In this connection it is interesting to note that, of the 330 milk epidemics (typhoid, scarlet fever, and diphtheria) collected by the writer, 243 have been recorded by English authors, 52 by American, 14 by German, 11 by Scandinavian, and 5 each by French and Australian writers. This is probably due to the fact that the English and Americans usually consume raw milk, while on the Continent milk is rarely used without being first boiled.

About 15 per cent of all typhoid cases are brought to the city from summer resorts and rural districts, and about 20 per cent may be spread through the agency of flies, personal contact, the consumption of raw oysters and shell fish raised in sewage-polluted waters, or the eating of strawberries, radishes, celery, lettuce, and other vegetables and fruits which have been contaminated with infected night soil. Hence the importance of carefully washing all uncooked articles of food.

TYPHOID FEVER IN THE RURAL DISTRICTS.

There is much reason for assuming that the undue prevalence of typhoid in rural districts is a fruitful source of infection to the urban population, chiefly through the milk supply and summer boarders.

When we consider the fact that over 70 per cent of our population resides in rural districts, that the "bone and sinew" of these are engaged in agricultural pursuits, and that they do not enjoy the benefits of enforced sanitation by local health boards, we see at once the desirability of the family physician extending useful suggestions on healthful building sites and homes, disposal of house wastes, the importance of a pure water supply, wholesome and properly cooked food, etc. As it is now, the diet is faulty, especially the hot biscuits and greasy fried dishes, while wells and privies are often dangerous neighbors, favoring the spread of filth diseases. The undue prevalence of typhoid fever could be materially checked by chemical disinfectants, or by adding to the discharges four or five times the quantity of boiling water kept in contact for at least ten minutes. While prompt disinfection of the excreta is of vital importance, we should also make an effort to get rid of the flies by prompt disposal of the horse manure in which they breed, the abandonment of open privies and surface pollution, substitution of the dry earth closet, or other rational methods for the collection and disposal of excreta, removal of garbage, etc.

PREDISPOSING CAUSES TO TYPHOID FEVER.

The writer, in his investigation of 500 cases in 1895, found that in a large number of cases, especially in the southwest and along the eastern branch of the Potomac, the system was very much debilitated by the malarial cachexia prior to the attack. What effect the James Creek Canal, the backing up of sewage and consequent flooding of

uncemented basements and cellars, or the emanations from the filth-reeking shores may have had, as a contributory factor, it is difficult to say. We know, however, that marshes breed mosquitoes, which are the carriers of malaria, and that, apart from the unwholesome emanations, the evaporation of water also increases the humidity of the air and thus intensifies the effects of both heat and cold, all of which can not fail to lower the power of resistance to disease. For these reasons his fifth recommendation, submitted in 1895, referred to sanitary measures looking to the reclamation of the stagnant and polluted marshes and the prompt disposal of sewage.

In this connection let us remember, however, that while the Anacostia flats are productive of disease, directly and indirectly, similar effects, differing only in degree, may be produced by filthy homes, back yards, and stagnant pools of water within the city limits.

The same report, on page 261, says:

> In addition to the germ, there must also be a suitable soil for its proliferation in the system, and this individual predisposition or vulnerability, which renders the body more liable to be acted upon by the germs, may be the result of debility, faulty nutrition, fatigue, excesses of all kinds, abrupt changes in temperature, impure air, mental depression, unwholesome food, and many other factors calculated to diminish the power of resistance of the individual.

The factors of environment and other predisposing causes are plainly revealed by the undue fatality in the colored population. The average typhoid death rate among the colored during the past ten years was 76.4, as compared with 47.4 for the whites.

Many of the factors concerned will be alluded to on page 210, and much may be done by uplifting influences and higher standards of living toward the removal of the predisposing causes of typhoid fever.

WHY IS THERE MORE TYPHOID FEVER IN WASHINGTON THAN IN NORTHERN CITIES?

Now that we have a pure-water supply this very pertinent question has been asked, and among the answers so far given may be mentioned the following:

1. Washington, like very many other southern cities, has a very large colored population, with their greater susceptibility to disease. This, however, accounts for only a certain percentage of the excess, as the rate for the white population is also abnormally high.

2. It is a well-known fact that all intestinal diseases are especially prevalent in hot climates and seasons. This is probably due to the fact that the blood is kept too long at the periphery on account of excessive perspiration, and the stomach and other internal organs suffer in tone and nutrition for want of adequate blood supply, and can not exert their normal defensive forces.[a] So, for example, typhoid-fever germs would be digested, like many other vegetable cells, as long as the digestive functions are normal, but if for any reason this function is impaired or arrested, this defensive force ceases, and the way for infection is open. Functional derangements of the stomach, together with the debilitating influences of heat, doubtless play an important rôle in increasing the general susceptibility to typhoid fever in all southern climes.

3. Doctor Woodward, our health officer, suggests that the greater intensity of heat in the South leads to the ingestion of larger quan-

[a] See page 80, Kober's Industrial Hygiene.

tities of water than are consumed farther north, and, therefore, so far as water-borne typhoid fever is concerned, to increased chances of infection. He also suggests that "intensity of heat and the long duration of the heated season probably lead to a more rapid and more extensive lowering of the water in the streams and wells than occurs in cooler regions, and thus lead to a greater concentration of infectivity, if the water in such streams and wells are infected. The temperature of the water in such streams and wells may be better suited to the lief of the typhoid-fever bacillus than is the temperature of northern waters. Moreover, owing to the greater duration of the summer season, the fly season is longer, and the period during which the diet of the people consists largely of uncooked articles is correspondingly extended. The chances of infection are therefore correspondingly increased in so far as relates to infection through foods. Still it would be but poor comfort to know that because Washington is a southern city it must continue forever to pay its death toll to the typhoid-fever Juggernaut; the problem must not be solved in that way. But the problem is not yet solved, nor is it likely ever to be solved until the investigation is taken up along broader lines than any that have yet been adopted; that is, until the investigation into the causes of the undue prevalence of typhoid fever in this District is made to include an investigation into the causes of the prevalence of typhoid fever elsewhere, so that by a process of comparison and exclusion the cause for the excessive typhoid fever rates in the District of Columbia can be ascertained."

PREVENTION OF TYPHOID FEVER.

The writer, in his report on typhoid fever in 1895, referred in his concluding recommendation to thorough disinfection of the excreta from all typhoid-fever patients, and greater care on the part of those connected with the sick. We have known for over twenty-five years that the typhoid germs are conveyed chiefly through the feces and urine of infected persons, that they are capable of reproduction within and without the body, unless killed by certain physical or chemical agents. We have already mentioned that even the addition of four or five times the volume of boiling water to feces or urine will effectually destroy the vitality of the germs. If chemical agents are used the method must be thorough and exact. The attendant must prepare and use germicidal solutions of standard strength, and unless this is done the whole process is a snare and delusion. So, for example, all vessels containing stools should be filled with a double volume of a solution of chloride of lime (6 ounces to the gallon), or a 5 per cent solution of carbolic acid, 6 ounces to 1 gallon of boiling water, or a corrosive sublimate solution, 60 grains of corrosive sublimate, 2 teaspoonfuls of table salt to 1 gallon of water, or any of the standard disinfectants; and kept in a covered vessel for at least one hour before emptying. Disinfection must also extend to the patient's soiled body, clothing, and bedding, and to the hands of the nurse. If this is not done there is danger from so-called contact infection. Infected fingers may contaminate the food, while a fly alighting upon a soiled part may carry the germs on its feet to the food and drink of the other inmates or even to some neighboring houses. Prompt and efficient disinfection will destroy the principal sources of infection, and if carried

out universally, would go far toward removing typhoid fever from the face of the globe. That this is possible is shown by the fact that the typhoid rate in Berlin has been reduced from 142 per 100,000 of population in 1872 to 5 in 1906.

The causes of typhoid fever in this city are perhaps more complex and varied than elsewhere; no one factor can alone be held responsible for its undue prevalence, and in the prevention of the disease due attention must be paid to the removal of all the causes likely to influence its spread.

Among the sanitary measures which should be invoked are the following: The expenditure of $100,000 asked for by Major Cosby for the perfection of the quality of the filtered water. While the installation of the filtration plant has resulted in an improved water supply, it is found that during periods of great turbidity, especially during the months of December and January, the number of bacteria remaining in the effluent exceeds permissible limits. It has also been shown that the efficiency of the filters, as regards removal of bacteria, can not be increased without previous chemical treatment of the water at such periods. In view of the fact that the degree of danger varies with the number of bacteria left in the water, no effort should be spared to eliminate these high counts by the methods proposed by the engineer in charge.

The prevention of river pollution involves problems which should be solved in the interest of this and other communities using a public water supply from interstate rivers, under which circumstances the inhabitants of one Commonwealth are powerless to protect themselves against the misdeeds of their neighbors.

The abandonment of public and private wells and box privies, wherever found, the removal of slums, insistence upon clean homes, back yards, basements, cellars, alleys, streets, and vacant lots, and more stringent laws for the production and sale of milk and cream, together with the reclamation of the Anacostia Flats can not fail to diminish some of the contributory factors in the prevalence of the disease.

Many of these measures have been urged by the commissioners and the health officer for years, and it is the duty of every good citizen to strengthen their hands in their well-directed efforts. In addition to all this, there is special need for more visiting nurses and social workers to instruct our neglected neighbors in higher standards of living, and finally, more attention should be paid in our schools to hygienic and sociological questions, so that the average child may learn the essentials for the preservation and promotion of health.

DIARRHEA AND DYSENTERY.

While diarrhea is a symptom of very many diseases, there is reason for believing that certain forms, occurring in infants as well as adults, toward the middle or close of a hot, dry summer, are caused by the consumption of tainted food, milk, impure water, etc., superinduced by putrefactive bacteria, and that the serious forms of summer complaints are due to specific germs.

From what we know of the nature and cause of dysentery we are led to consider it an infectious disease, which is spread very much like typhoid fever. The tropical form of dysentery is caused by an ameboid organism, while the type most prevalent in this country is due to a bacillus.

In our present state of knowledge we may conclude that the virus of dysentery, whether of the bacillary or amebic type, proceeds from the intestinal discharges of a previous case, and the most usual mode of transmission of the germs is through the water supply. This is the opinion of Virchow, based upon personal experience in Egypt, and Uffelmann has frequently observed that persons using boiled water during a dysentery epidemic remained exempt, and that the simple closing of a suspicious well often checked the spread of the disease. It is also perfectly conceivable that the germs may be spread through soils strongly polluted and infected with excrementitious matter, and with particles of dust gain access to milk, fruit, fresh vegetables, etc., which are eaten raw. The agency of flies in carrying the germs from infected sources to the food supply can not be ignored.

Temperature also plays an important rôle in the development of the disease. At all events, statistics show that in temperate climates the disease assumes epidemic proportions in July, August, and September, and declines with the approach of cold weather; it goes hand in hand, therefore, with a maximum temperature of the air and soil. It is also a clinical fact that badly nourished individuals, and those suffering from indigestion or intestinal catarrhs, are especially liable to be attacked.

Prophylaxis: In the attempt to prevent epidemic extensions of these diseases the water supply should be looked after, and every source of contamination of wells, springs, and public reservoirs must be avoided, and suspicious supplies closed.

The public should be enlightened as to the nature of these diseases, and especially of the necessity for prompt disinfection of stools. It should also be informed that indigestion, the result of indiscretion in eating and drinking, and chilling of the body increase the susceptibility; that it is desirable during the prevalence of these diseases to use only boiled water and milk, and to avoid the consumption of raw vegetables and fruit, unless they have been thoroughly washed with water previously boiled.

CHAPTER IV.

INFANTILE MORTALITY.

According to Oesterlein's statistics it is safe to assert that the average death rate during the first year of life is 188 out of 1,000 infants born.

According to the census of 1900 the infantile mortality per 1,000 births in the so-called registration States was as follows:

District of Columbia	274.5
Rhode Island	197.9
Massachusetts	177.8
New Hampshire	172.6
New Jersey	167.4
New York	159.8
Connecticut	156.8
Maine	144.1
Vermont	122.1
Michigan	121.8

It will be seen that the rate of Vermont and Michigan is less than one half that of the District of Columbia.

The rates in foreign countries likewise vary considerably. In France the average rate from 1874 to 1893 was 167; in 1903 it had fallen to 137, practically the same as that of New Jersey.

According to Harrington* our highest rate about equals Russia, and it is not much greater than that of Austria. Rhode Island makes a better showing than Germany and Italy. The German rates for the five years 1901–1905 were 216, 184, 202, 204, 204. The Italian rates are 170. Maine stands with England and Wales, and better than Belgium and the Netherlands. The rates for England and Wales are 150; Belgium, 156; the Netherlands, 147. The rate of Vermont is lower than Scotland (126), Denmark (127), Finland (134), or Switzerland (144). Michigan is also lower than Scotland (126). The following countries have lower rates: New South Wales, 108; Victoria, 105; Ireland, 105; South Australia, 102; Queensland, 101; Sweden, 98; Norway, 90; New Zealand, 79.

These are mean rates for rural and urban districts. In towns and cities the mortality is always higher, amounting to 33.6 per cent, as compared with the rural mortality of 27.8 per cent.

The District of Columbia in 1900 had the unenviable reputation of leading the list of the registration States in infant mortality, but the rate of Washington as a city compares favorably with other cities.

The census of 1900 gives a list of 106 cities and towns with infantile death rates in excess of 175. In 9 cases the rate exceeded 300; in 38 it was between 200 and 280, and in 49 it was between 175 and 200.

The following is a partial list of these cities:

Charleston, S. C	419.5	Norfolk, Va	284.6
Savannah, Ga	387.5	Lowell, Mass	275.5
Mobile, Ala	344.5	Washington, D. C	274.5
Key West, Fla	311.8	Baltimore, Md	235.1
Biddeford, Me	311.6	New Orleans, La	220.2
Atlanta, Ga	306.0	Detroit, Mich	201.2
Fall River, Mass	304.7	Philadelphia, Pa	201.9
Lynchburg, Va	301.7	Newport, Ky	189.8
Richmond, Va	300.7	Indianapolis, Ind	173.5
Laconia, N. H	294.6	Kansas City, Mo	168.8
Shreveport, La	293.5	Springfield, Ill	167.4
Jacksonville, Fla	287.6	New York, N. Y	189.4

*Harrington, Infantile Mortality, "Am. Jour. Med. Sc.," December, 1906.

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The following is a list of 24 German cities with excessive infantile death rates:

	Infantile death rate.	Diarrheal infantile death rate.	Percentage of infantile deaths due to diarrheal diseases.
Chemnitz	270.99	135.67	50.07
Stettin	260.54	112.28	43.09
Posen	248.29	92.82	37.27
Nuremberg	247.58	113.80	45.97
Breslau	244.99	98.62	40.36
Dantzig	243.19	109.87	45.18
Halle	235.71	124.77	52.94
Magdeburg	233.82	100.78	43.14
Königsberg	233.25	113.47	48.65
Leipzig	222.14	121.49	54.69
Rixdorf	218.49	103.66	47.44
Munich	217.99	95.53	44.14
Cologne	212.45	93.60	44.06
Plauen	208.01	35.25	16.95
Stuttgart	205.68	74.80	36.38
Mannheim	203.67	86.46	38.46
Berlin	199.68	87.99	44.08
Brunswick	196.64	81.22	41.32
Aachen	195.12	78.60	40.28
Dresden	191.29	83.28	43.51
Strassburg	190.45	92.82	48.74
Düsseldorf	187.97	82.43	43.85
Karlsruhe	185.12	86.17	46.55
Dortmund	184.99	61.76	33.38

In 1904, in the 823 German cities and towns having populations exceeding 15,000 the rate was 202. In the twelve months ended June 30, 1906, in 32 German cities with a population of over 100,000, the rate was 198. (Harrington.)

From the foregoing figures it appears that in many cities, out of every 1,000 children born alive, over one-third perish before the completion of the first year; but fortunately for the perpetuation of the human race the average infant mortality all over the world is only about one-sixth of those born.

Of the twelve months during the first year of life the first month furnishes the highest mortality. Of the 1,233 infantile deaths reported in this city in 1906, 222 were due to premature birth; 40 to congenital debility; 28 to malformations, and 9 to difficult labor. The first month is followed by the second, third, and fourth months, probably also because of diminished vital resistance. The tenth, eleventh, and twelfth months are also dangerous months, as this is at the usual period of weaning with its attending danger from digestive diseases incident to artificial feeding. We have already referred to diarrheal diseases as the principal cause of infantile mortality. A mortality of 40 per cent from diarrheal diseases and 2.5 per 1,000 from tubercular diseases of the abdominal lympathics and glands can not fail to claim our attention, and certainly points, with more than mere suspicion, to the fact that the morbific agent in these cases is introduced into the body with the food, especially unwholesome and infectious cow's milk. Nor is it improbable that the 21 per cent who die from affections of the respiratory organs are largely the victims of ignorance as regards temperature and clothing and other environments of the child. The infant mortality is everywhere influenced by extremes of heat and cold, but the hot months, like

July, August, and September, are the most dangerous on account of the disastrous attacks of diarrheal diseases. The fatal influence of heat is graphically shown in the accompanying chart. (See next page.) The deaths from diarrheal diseases ranged according to months, from 5 in January to 108 in July and 58 in August, after which there is a rapid decline. The same abrupt changes are noted in the large statistical material of German cities in 1905, dealing with 128,035 deaths under one year, the deaths from diarrheal diseases ranging from 1,192 in January to 15,863 in August.

High infantile mortality rates have always been considered the opprobrium of the healing art. Dickson asked over fifty years ago, "How shall we prevent the early extinction of half the newborn children of men?" While powerless to solve all the mysteries connected with this subject, an attempt will be made to answer the practical question. Can they be reduced? Space will not permit to enter into detail of infant hygiene, but we must at least point out the fact that the mortality can be greatly reduced by improving the original stock, i. e., the physique and habits of the parents, and placing them, as well as their offspring, under more suitable environments, especially with reference to fresh air, sunlight, exercise, suitable clothing, and habitations, and last but not least, proper food.

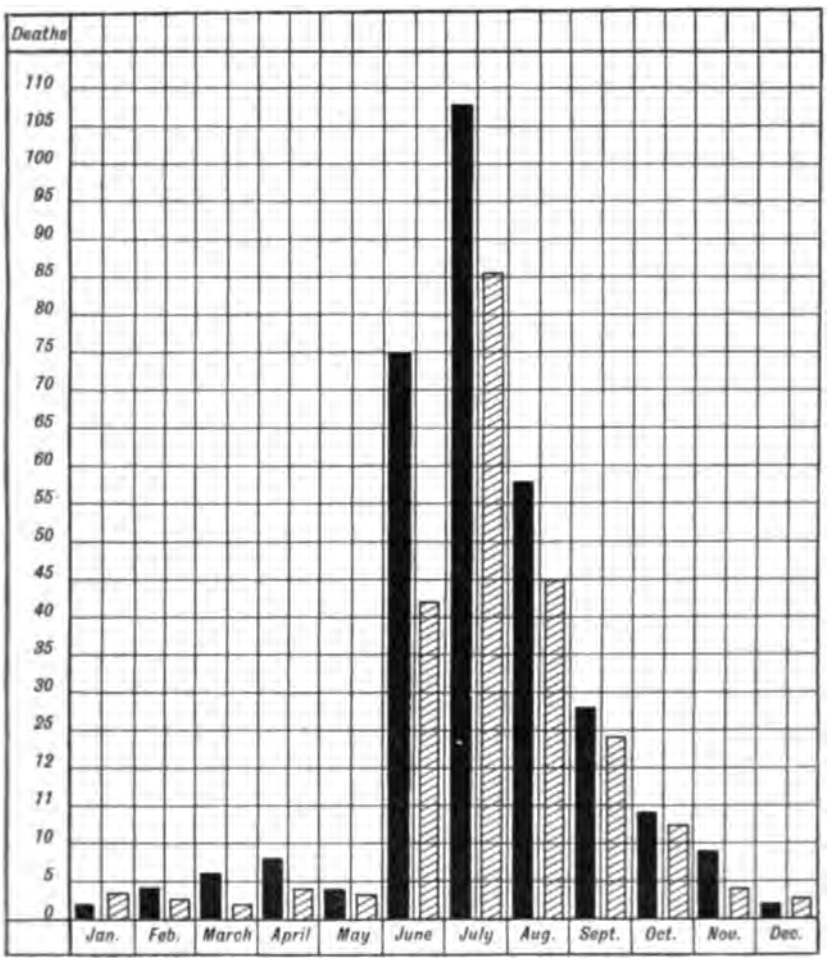
The influence of favorable hygienic conditions was demonstrated by Casper's statistics, published as early as 1825, showing that the infant mortality rate among royal children was only 57, as compared with 345 per 1,000 among the infants of the poor. Of 170 deaths from infantile diarrhea, investigated by Helle in Graz in 1903 and 1904, not one belonged to a rich family, and but 9 to the well-to-do class, while 161 belonged to the poor and the very poor. Clay calculates that of every 100 children born in England, 90 will be alive at the end of the first year of those born in aristocratic families, 79 in the mercantile class, and 68 among the laboring classes. The relation of infantile mortality to the occupation of the women has already been discussed in a previous report.

Dr. George Reid, at the National Conference on Infantile Mortality, held in London in June, 1906, contrasted the infantile mortality in two districts, identical in health conditions, but with the important difference that in one women are largely employed in industrial pursuits, and in the other there is practically no employment for them, with the result that the infantile mortality varied from 149 to 198 per 1,000.

The infantile mortality returns in the United States also indicate that we are dealing with a class mortality, which is highest in communities where women are employed in mills and other gainful occupations, and in consequence the children fall victims to ignorance and neglect. Contrast, for example, the census rates for 1900 of Fall River, Mass. (304.7); Lowell, Mass. (275.5); Nashua, N. H. (261.2); Lawrence, Mass. (246.5); Manchester, N. H. (238.4), all typical mill towns, with the rate at Cambridge, Mass., which was 186.5. The seasonal and climatic influences are of course the same and, presumably, also, the general quality of the milk supply, hence we must look largely to sociological factors for an explanation, such as has been offered on pages 78–80,[a] and may be summed up in igno-

[a] Kober's Industrial Hygiene.

MONTHLY DEATHS FROM INFANTILE DIARRHEAL DISEASES DURING 1906 COMPARED WITH AVERAGE MONTHLY DEATHS FOR PAST TEN YEARS.



■ *Deaths from Diarrheal Diseases during 1906.*

▨ *Average annual deaths from Diarrheal Diseases for 7 years.*

Reproduced from the Report of the Health Officer, District of Columbia, 1907.

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rance and poverty. The same explanation applies to the excessive rates among colored infants in many of our States and in our own city. During the year 1906 the number of children under two years of age who died in Washington from diarrheal diseases and inflammation of the bowels was 318, 146 white and 172 colored. The corresponding death rate per 100,000, calculated on the basis of the entire population, was for the white population 63.1 and for the colored population 181. If any further argument is necessary to show the influence of sociological factors, it will be found in the fact that 1,792 of the 2,711 infantile deaths investigated by Neuman in Berlin in 1903 occurred in 1-room dwellings, 754 in 2-room, and 165 in 3-room and larger dwellings.

The difference in the mortality of legitimate and illegitimate children is very great and varies, according to Uffelmann, as follows:

	Legitimate children.	Illegitimate children.
	Per cent.	*Per cent.*
France	15.0	30.0
Austria	22.9	35.1
Sweden	13.0	34.8
England	14.0	36.0

But the most frightful mortality rates are everywhere furnished by the hand or bottle fed children.

Doctor Newsholme,[a] the medical officer for Brighton, England, states that breast-fed infants contribute but one-tenth of the deaths from infantile diarrhea. W. J. Tyson[b] asserts that three-fourths of the 150,000 infantile deaths in Great Britain were those of bottle-fed children. Indeed, we have evidence that of the 54,027 infantile deaths which have been investigated at home and abroad with reference to feeding, 86.6 per cent had been artificially fed, all of which points to the fact that the quality of the food, chiefly cow's milk, in hand-fed children, plays the most important rôle. This assumtion finds, moreover, support by the fact that the infantile death rate and diarrheal diseases in children under five years of age have materially decreased in a number of American cities since the enactment of pure-milk laws, notably in Buffalo, Rochester, Chicago, New York, and Washington. The report of the health officer of the District of Columbia for 1906, page 11, says:

> High as is the infantile mortality rate even now from diarrhea and inflammation of the bowels, it is far below the figures that formerly prevailed. During the five-year period 1880–1884 the death rate from diarrhea and inflammation of the bowels among children under 2 years of age was 162 per 100,000 per annum. During the five-year period 1885–1889 the average annual rate was 168. During the next period, 1890–1894, the death rate rose to 175, but in the year 1895 a diminution began. During the period 1895–1899 the death rate from the diseases named was only 135; in the period 1900–1904 it was only 109; in 1905 it was 104, and in 1906 it was only 97.
>
> The only explanation for the fall in the death rate from infantile diarrhea that I have been able to discover is the enactment, on March 2, 1895, of the law regulating the sale of milk in the District of Columbia and the establishment of dairy and dairy-farm inspection under the provisions of that law. * * *

[a] Journal of Hygiene, April, 1906.
[b] Journal of State Medicine, September, 1904.

MATERNAL NURSING.

The mortality statistics in hand-fed children are the most eloquent arguments which can be offered in favor of breast feeding.

Recent statistics collected by Von Bunge in different parts of Europe indicate that probably 75 per cent of the women could nurse their children. Budin asserts that 448 out of 557 women who attended one of the Paris clinics were able to nurse their children. Madame Dluski, in an able thesis, maintains that of every 100 healthy women, when the necessary conditions of alimentation and repose are present, 99 are actually able to nurse their offspring. The importance of maternal nursing is emphasized in different parts of Europe by popular education, and by the enactment of laws requiring, in industrial establishments where 50 or more women are employed, special rooms for maternal nursing. On the other hand, statistics collected by Hegar in large obstetrical institutions in Germany indicate that only about 50 per cent of women are capable of nursing their offspring for merely a few weeks, and the question naturally arises: What are the causes of this inability to discharge their sacred maternal duties? Among them may be mentioned physicial inability as a result of insufficient or improper food, hard work, care, hereditary debility and disease, tuberculosis, alcoholism of the woman's own father, modified syphilis, or nervous diseases in the family. Von Bunge believes that, apart from actual disease in the mother, alcoholism is one of the chief causes, as the daughters of the third generation of alcoholics are usually unable to nurse their offspring. The effects of hard work and gainful occupations have been pointed out,[a] but there is absolutely no excuse for mothers who, although physically able-bodied, are disinclined to nurse their children, chiefly as a matter of ease, comfort, and social pleasures, and who, instead of employing a healthy wet-nurse, prefer artificial feeding, and often resort to patent baby foods.

Dr. Henry D. Fry,[b] professor of obstetrics, Georgetown University, in his excellent monograph on maternity, states that such foods are more often the cause of scurvy than other nourishment. On page 149 he says:

> Pictures of fat babies smile at us from the pages of newspapers and magazines, and the advertisements say they were raised on this or that food product. Unfortunately, many babies have been raised to "worlds unknown," but we do not see their pictures. The evidence of this must be sought in graveyards, where tombstones bear silent witness to the high rate of mortality in early life.

These remarks are equally applicable to the pernicious use of "soothing" and "teething" sirups, "babies' friend," etc.

Professor Jacobi [c] offers some excellent advice when he says:

> Infants are the future citizens of the Republic. Let the Republic see that no harm accrue from the incompetence or unwillingness to nurse. * * * From a physical, moral, and socio-political point of view, there is only one calamity still graver, that is to refuse to have children at all. * * * The human society of the future will have to see to it that no poverty, no cruel labor laws, no accident, no luxurious indolence must interfere with the nursing of infants.

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[a] Kober's Industrial Hygiene, p. 78.
[b] Fry, Henry D., "Maternity," 1907.
[c] The History of Pediatrics, etc., "Jour. Am. Med. Asso.," November 5, 1904.

We are building hospitals for the sick of all classes; asylums for the insane, neuropathics, and drunkards; nurseries and schools for epileptics, cretins, and idiots; refuges for the dying consumptives, and sanatoria for incipient tuberculosis. We are bent upon curing and upon preventing. Do we not begin at the wrong end? We allow consumptives and epileptics to marry and to propagate their own curse. We have no punishment for the syphilitic and gonorrheic who ruins a woman's life and impairs the human race. Man, however, should see that his kind must not suffer. One-half of us should not be destined to watch and nurse and support the other half. Human society and the state have to protect themselves by looking out for a healthy, uncontaminated progeny. Laws are required to accomplish this. * * *

As a matter of fact, Indiana, Wisconsin, Michigan, and Connecticut have laws prohibiting the marriage of epileptics. Indiana also prohibits marriages of persons suffering from transmissible diseases, and, by an act of 1907, "confirmed criminals, imbeciles, idiots, and rapists, procreation by whom is deemed inadvisable by experts, shall be unsexed by surgical operation."

Until there is greater perfection in the physical, moral, and economical conditions of the human race, there will always be a large percentage of infants deprived of their natural food. In order to appreciate the dangers of artificial feeding it may be well to point out briefly some of

THE ANATOMICAL AND PHYSIOLOGICAL CHARACTERISTICS OF INFANTS.

The average weight of a healthy newborn male child is 3,500 grams, and of a female 3,000 grams; at the expiration of the first month the child should weigh about one-third more than at birth; during the middle of the fifth month it should have doubled its weight, and at the completion of the first year it should weigh three times its original weight.

At the end of the second year the normal child should weight about 12,000 grams, or a little over 26 pounds. Any decided variation should cause the mother to seek proper advice. It should also be remembered that the anatomical elements of the digestive tract of infants are very delicate and vulnerable and especially susceptible to injurious influences, such as cold or improper food, atmospheric temperature, etc. The saliva, up to the tenth month, is scant and incapable to any considerable extent of converting starchy food into sugar, a property only fully developed about the expiration of the ninth month.

The muscular coats of the stomach are delicate, and vomiting is easily provoked; the gastric glands secrete a juice which is less acid than in after years, and the contents are passed from the stomach into the upper intestinal canal at intervals of one and three-fourths hours. The pancreatic juices for the first few months in life are scant, and up to the fourth or sixth week incapable of converting starch into sugar, but fully prepared to digest the proteids and fats of the milk. The stools of a normal infant scarcely exceed two or three during the twenty-four hours; they are of a semiunctuous consistency and orange or egg-yellow in color.

There can be no question that the natural food is breast milk from a healthy mother—no other food insures to the same extent the physiological development of the child. A normal infant requires a daily supply of milk to the amount of about one-seventh of its weight.

The average composition of human milk, after the regularity of lactation has been established, is about as follows: Water, 87.30 per cent; proteids, 1.5 per cent; fats, 4 per cent; sugar, 7 per cent; and mineral salts, 0.2 per cent. The composition of the milk is by no means constant, and is influenced by a number of factors, such as the age of the mother, food, habits, emotions, race, physical peculiarities, etc. The digestibility of human milk is nearly perfect, as 97 per cent is generally utilized; all of the constituents are absolutely essential to health and a proper growth of the body.

CARE OF THE BREASTS.

The mother should take special care of the nipples and breasts and can prevent much physical suffering, from local inflammatory affections, by washing the parts after each nursing with plain water and careful drying.

It is very doubtful whether the practice of washing the nipples during the last three months of pregnancy with alcohol and astringent lotions is productive of good; indeed, Professor Fry[a] believes they are harmful by drying up the secretions of the sebaceous glands and making them more liable to crack, and he recommends instead the application of cocoa butter, lanolin, albolene, vaseline, or castor oil.

Much can be done at the outset in preventing sunken or depressed nipples by avoidance of tight clothing, but when they do occur they should be treated by the attending physician.

FREQUENCY OF NURSING.

There is nothing to justify the frequent practice of administering to newborn infants different teas and sweetened water during the first few days after birth. Plain boiled water, at a temperature of 99, may be given; but above all we should endeavor to establish regular habits at the outset and avoid overfeeding. Professor Heubner believes that the number of feedings heretofore advocated is too great, and a less number is productive of better results. In this he is supported by other competent observers, and Doctor Schereschewsky,[b] in his excellent article on "Infant Feeding," gives the following schedule, which seems to fulfill the best practice in this direction:

Age.	Nursings in 24 hours.	Interval during day.	Night.
First day	4	6	1
Second day	6	4	1
Third to twenty-eighth day	8	2½	1
Fourth to thirteenth week	7	3	1
Third to fifth month	6	3	0
Fifth to twelfth month	5	4	0

The infant during the first four or five days after birth usually loses about 8 per cent of its weight. It should then regain lost weight and continue to gain at the rate of 120 to 150 grams (4 or 5

[a] Fry, Henry D., "Maternity," 1907.
[b] Bulletin 41, Public Health and Marine-Hospital Service, 1908.

ounces) every week during the first three months, and from the third to the sixth month it should gain about 100 to 120 grams or from 3½ to 5 ounces each week.

By weighing the baby regularly we can judge with precision of its general progress. Professor Fry [6] says:

A baby that is at a standstill or losing weight is not getting enough food. Crying under these circumstances means more food or a better quality of the food. In order to differentiate between the cries of hunger, colic, or earache, he points out that a hungry baby cries after it has been nursed and cries before the next feeding. He suggests placing the finger in its mouth, when it will stop crying and suck it for a moment and then cry again at its disappointment. Nursing babies may be starving in spite of an abundant secretion of breast milk. The fluid may be abundant in quantity but poor in quality. The nutritive value of breast milk can be ascertained by a simple method. Draw off some and let it stand in a test tube over night. If normal a good layer of cream will form on top—from 3 to 4 per cent. If poor the color is pale blue at first, the next morning watery, and the cream will be only 1 per cent or a little more. Very bad milk will show less than 1 per cent of cream. Again, a starving baby is not nourished properly. To find this out examine the skin over the tibia (shank). If the baby is not getting enough nourishment the skin can be pinched up with the fingers; if properly nourished the skin is firmly attached to the underlying tissue and the grasp of the fingers slips over it. This point is demonstrated by examining the skin on the back of anyone's hand. Extend the fingers and the skin is easily picked up, like that over the tibia of a starving baby. Close the fist and the skin is tight, as one will find it over the shank of a properly nourished baby.

WEANING OF INFANTS.

It is believed that a normal woman who enjoys a good appetite and a supply of good wholesome food, obeying the ordinary rules of health, will have no difficulty in discharging her maternal duties. Nature probably intended that the infant should subsist upon breast milk until the eruption of the first molars, and many mothers actually nurse their offspring until the twelfth or fifteenth month.

If we can appoint our own time, the weaning should be gradual and not considered before the tenth or twelfth month, especially not during the hot months, provided the health of the mother is good and the child is doing well. It would be very unwise to wean a sick child unless the sickness is caused by the mother's milk.

An inadequate supply of breast milk can be made up by mixed feeding, and surely even a half supply of normal mother's milk for sick children is better than a full supply of prepared milk.

CONDITIONS WHICH MAY COMPEL RECOURSE TO ARTIFICIAL FEEDING.

Unfortunately, there are a number of reasons which may render the employment of a wet nurse or recourse to artificial feeding imperative at any period of lactation:

1. A motherless child, or when the mother is suffering from an infectious or communicable disease, such as typhoid fever, pneumonia, etc. A tuberculous mother would not only aggravate her disease but also expose the child to infection.

2. Childbed fever and other severe complications of the parturient state, such as hemorrhages, convulsions, inflammation of the kidneys;

[6] Maternity.

also in anemic and in cachectic and serious nervous conditions, such as chorea and epilepsy.

3. Inflammatory conditions of the nipples and breast, because of the admixture of pus and disease germs.

4. When no milk is secreted, and deformities and anomalies of the nipple and breast exist which can not be corrected.

5. Return of menstrual period or early pregnancy, if resulting in digestive derangements or malnutrition in the child.

If under such circumstances the employment of a wet nurse is impracticable, artificial feeding must be considered and the question confronts us, What is the best possible substitute for human milk, the requirements of which are:

1. That it must offer the same character and amount of nutritive elements and in the same proportion as human milk.

2. The nutritive elements must be present in the same digestible form and of the same consistency, and should be introduced into the stomach at a temperature not less than 98° F. by means of slow suction at proper intervals.

3. This substitute must not contain any morbific or infective agent, whether originally present or introduced during the preparation or keeping of the same.

A moment's reflection upon the physiology of infantile digestion will at once suggest the propriety of rejecting all starchy foods before the expiration of the tenth month, except in very limited quantities and previously converted into maltose by boiling, as in barley water. Since milk is the natural food of all mammalia few will be disposed to doubt that some modification of cow's milk offers the best possible substitute.

COMPARISON OF COW'S MILK AND HUMAN MILK.

The difference in the composition is shown in the following table:

	Woman's milk.	Cow's milk.
	Per cent.	*Per cent.*
Fat	4.00	3.00
Proteids	1.50	4.50
Sugar	7.00	4.50
Salts	.20	.80
Water	87.30	87.20
	100.00	100.00
Calories per kilo	710.50	700.00

Human milk contains, therefore, less proteids and salts and more fat and sugar. There appears to be also a difference in the quality of the casein of the two secretions.

The addition of dilute acid in a test tube to cow's milk precipitates the casein in hard coagula or lumps, while in human milk it separates into a fine powder giving the appearance of light flocculent curds, which readily dissolve in an excess of acid. Since the coagulum in the same quantity of human milk is but one-fifth as large as that of cow's milk, this difference, which is solely one of compactness and solubility, is believed to influence the digestibility of the two secre-

tions. This statement has been questioned, however, by Heubner, whose studies indicate that when the test-tube experiments are carried on to imitate the movements of the stomach the resulting curd is quite as fine as the curd of human milk. He also verified his conclusions by withdrawing cow's milk shortly after ingestion by infants with a stomach tube. Admitting that Heubner is correct in assuming that cow's milk contains the same constituents, but in different proportions, which can be corrected by modifying it, there still remain differences which are important, especially the fact that human milk is always fresh and, from a healthy mother, rarely contains micro-organisms, while cow's milk is never free from bacteria, and may, moreover, be the vehicle of infectious germs and other morbific agents.

EVIDENCE THAT COW'S MILK MAY BE A CAUSE OF DISEASE.

1. It has been shown that certain diseases in the cow are communicable to man through the medium of the milk. This is especially true of tuberculosis, foot-and-mouth disease, anthrax, and cowpox. The writer, in 1903, published 86 cases of milk-borne tuberculosis, and Doctor Salmon has shown, from the vital statistics of Massachusetts and Michigan, that while there has been a marked reduction in the mortality of phthisis at all other ages, there has been a tremendous increase in the class under 5 years of age. There is also evidence to show that diseases like garget, inflammation of the udder and teats, digestive derangements, and septic fevers in the cow will render the milk morbific to man.

2. It has been shown that cows which have been fed on poisonous forage plants, or have been treated with strong medicaments for any or all causes, are disqualified from producing a pure or sound milk.

3. The writer has collected and taubulated the history of 195 epidemics of typhoid fever, 99 of scarlet fever, and 36 of diphtheria, all traceable to the milk supply. In a recent investigation into the causes of typhoid fever in Washington, the bureau of public health definitely traced 85 out of 866 (about 10 per cent) to infected milk.

Last but not least the writer desires to emphasize two important milk faults which may be considered sources of constant danger in infant feeding, and perhaps the most important factors in swelling the mortality rates of our helpless babes, viz, milk sediments (dirty milk) and their effects on premature acidity.

MILK SEDIMENTS OR DIRTY MILK.

Every consumer of milk has doubtless observed the presence of more or less foreign matter at the bottom of the bottle in which it is kept; indeed, it is a matter of such common occurrence that it hardly excites our attention, and many are disposed to look upon it as a matter of course. Professor Soxhlet, of Munich, was perhaps the first to point out that these deposits are largely made up of excrementitious matter from the cow, which, adhering to the udder of the animal, gained access to the bucket during the act of milking. If these sediments are subjected to microscopical examination we will find that they are composed of epithelial débris, hairs of the cow, organic and inorganic dust particles, excrementitious matter, vegetable fibers,

bacteria, fungi, and spores of every description; fully 90 per cent of the germs are fecal bacilli—all of which is not only disgusting but extremely suggestive of danger. The number of micro-organisms is largely increased, and we know that under a suitable temperature bacterial development and consequent decomposition are materially hastened in such a medium.

The greatest danger from milk of this class is the possible presence of ptomains or toxins produced by certain saprophytic germs acting on the albuminoids of the milk. Professor Vaughan, of Ann Arbor, Mich., in 1885, isolated a poison called tyrotoxicon, which is one of the causes of the toxic symptoms in some cases of milk poisoning, cheese and ice-cream poisoning. The presence of the very filth referred to, a summer temperature, and the pernicious habit of placing the milk before cooling in cans and bottles perhaps dirty besides, constitute favorable environments for the development of this and analogous poisons.

Germ development and acidity of the milk are influenced by temperature. Milk when it leaves the udder of the cow contains very few germs; the majority gain access during unclean handling, especially when the milking is done in a dirty stable, or from excrementitious matter adhering to the udder and teats of the animal. These germs multiply with astonishing rapidity whenever the temperature of the milk is above 50° F., and if disease germs are present their proliferation augments the chances of infection. A temperature of 58° or 60° F. will not subserve the interest of public health. So, for example, Petruschky has shown that at the room temperature a streptococcal content of 300 per cubic centimeter may increase in twenty-four hours to one of 10,000,000, but the same milk kept at 50° F. yielded but 30,000, or but three one-thousandths as many.

Von Freudenreich ("Dairy Bacteriology," London, 1895) exposed a sample of milk containing 153,000 bacteria per cubic inch to a temperature of 59° F.; one hour after it contained 539,750 bacteria per cubic inch; two hours after, 616,250; four hours after, 680,000; seven hours after, 1,020,000; nine hours after 2,040,000; twenty-five hours after, 85,000,000.

Bryce, of Toronto, has made similar investigations. All of which indicates the extent of germ development which must go on in milk transported over long distances during the summer months, when the mercury ranges from 85° to 95° and the cans are allowed to stand in the sun without ice; and we can appreciate why even 100,000,000 of bacteria per cubic centimeter have been found in samples of Washington milk, far exceeding the number usually found in the sewage of cities. Other cities are, however, similarly afflicted, and nothing short of clean, decent habits in handling the milk and keeping it at a temperature of 50° F. will prevent the mischief. Dr. H. C. Plant, of Leipzig, found, as a rule, that in warm weather the so-called fresh milk delivered in the morning is unfit for young children, and of 47 infants whose milk supply was carefully investigated by him 18 developed serious digestive and intestinal diseases, and 6 died. One of the chief reasons why there are less deaths from infantile diarrhea in the country than in towns and cities, in proportion to the population, is that the milk used is comparatively fresh, contains fewer germs and less toxins. Without doubt dirty and sour milk, or milk which is on the point of turning, are the chief causes of diarrheal

diseases in bottle-fed children, and in the more acute cases we have the phenomena of cholera infantum, due most likely to a toxic character of the milk. These views have steadily gained ground and have resulted in great sanitary reforms in our milk establishments, the fruits of which are already apparent in the decrease of deaths from infantile diarrhea in this city. (See page 187.)

PRODUCTION OF PURE MILK.

The Washington market milk compares favorably with the supply in other cities; there is no evidence to show that it is worse, but there is abundant evidence to indicate that stale, dirty, and infected market milk is everywhere responsible for a needless sacrifice of human life, and it is clearly the duty of the State to take what precautions it can to prevent sickness and distress.

Those who are familiar with the surroundings of our milk farms and the habits of the average dairy employee need no arguments for the necessity for sanitary reforms, and the principles which ought to be carried out should be embodied in effective laws and accepted and enforced in a practical sense. Honorable men will not object to regulations calculated to promote the purity of their product and the health of their customers, and as many of the most serious faults in the milk business are the result of ignorance rather than of intentional neglect, the difficulties will be materially lessened by proper education and trade competition.

Pure natural milk can only be secured at dairies with sanitary buildings, a pure water supply, healthy, well-fed, and well cared for cows, a well-equipped and well-kept milk room, provisions for thorough cleanliness, intelligent and conscientious people in charge, and clean methods throughout.

CERTIFIED MILK.*

It was in consequence of a just appreciation of these principles that the so-called "certified milk" came into existence about ten years ago. Responsible bodies of citizens interested in an improved milk supply organized in different cities milk commissions. Such commissions usually select and secure the advice and assistance of four experts—a veterinarian, a physician, a bacteriologist, and a chemist—all more or less familiar with the conditions and possibilities on dairy farms. The commission sends to each dairyman who supplies milk to the city a circular naming all the particular conditions which should be found on every farm where milk is produced for city use, and announcing that where any dairyman notifies the commission that he is fully conforming to the conditions specified, or endeavoring to do so, his dairy will be inspected, and, if it is found to comply in letter and spirit to all the requirements, his name will be placed upon an approved list and he will receive official indorsement to the effect that his dairy farm and the herd thereon have

* Extract from a Report of the Committee on Sanitary Relations to a conference appointed by the Commissioners of the District of Columbia to consider and report upon the local milk supply. The writer was chairman of the subcommittee which submitted the report.

been thoroughly examined and found to comply with the conditions recommended by the commission. These conditions include a healthy herd, the use of pure feeds, appropriate stabling and care, pure water, and clean and prompt handling of the milk, which is of good composition and quality and so free from pathogenic and unnecessary bacteria as reasonable safeguards can provide. The attendants are cleanly and free from communicable diseases, and all milk is promptly cooled, immediately after milking, to a temperature of 50° F. Every intelligent dairy farmer insists upon cooling his milk as soon as the bucket is full.

The inspections are made unannounced and at irregular intervals, so as to insure maintenance of the prescribed standard. Any neglected condition is immediately reported to the commission, which decides whether or not the cause is sufficient to withdraw and cancel the last certificate issued.

PASTEURIZED MILK.

It must be apparent that it will require time and education to secure compliance with even reasonable safeguards, and it is equally evident that the number of dairy farms now in a position to live up to sanitary requirements will supply but a small percentage of the population, although it is hoped that such dairy farms will be stimulated into existence by trade competition and the refusal of the public to buy dirty milk at any price. Until this is accomplished, the committee, in the interest of public health, strongly advocates clarification and pasteurization of all milk. This, to be sure, will not make bad milk good, but it will at least destroy its power to transmit disease germs.

PASTEURIZING PLANTS OR MILK DEPOTS.

Your committee also believes that this object can be most efficiently and economically secured by the establishment of a pasteurizing plant provided by the District government or, preferably, by private enterprise, which plant should be under the supervision of the health department.

There is every argument from a commercial and sanitary standpoint in favor of a central plant, erected within reasonable distance from the Union Depot, where all the milk for the city should be received and prepared for distribution. Such a step would result in the creation of suitable conditions for the proper handling and storage of milk, sterilization of milk cans and utensils, and the efforts of the local milk dealers to provide decent facilities for their 150 or more dairies scattered over the city, all more or less liable to infection, could be concentrated in one plant with a decided saving of expense.

Milk should never be sold by grocery stores or milk shops unless it has been delivered to such establishment in original sealed bottles, and then only when there is provision for maintaining the milk at a temperature of 50° F.

ADVANTAGES AND DISADVANTAGES OF PASTEURIZED MILK.

Your committee is aware that there is a difference of opinion among medical men as to the wholesomeness of pasteurized milk. The advantages and disadvantages have been exhaustively studied by Dr.

M. J. Rosenau, director of the Hygienic laboratory of the United States Bureau of Public Health and Marine-Hospital Service, and in his opinion the advantages so far outweigh the disadvantages that he "unhesitatingly recommends compulsory pasteurization of all milk not certified under class 1 or class 2 of Doctor Melvin's classification."*

Your committee is so strongly impressed with the manifold dangers connected with the milk supply that until the needful reforms in dairy methods are accomplished it recommends to the public the following as immediate safeguards:

1. Do not patronize a milk dealer, at any price, whose milk after standing for two hours reveals a visible sediment at the bottom of the bottle. It is evidence of dirty habits, extremely suggestive of danger, and entirely preventable by clean, decent methods without greatly increasing the cost.

2. Subject all your milk to home pasteurization by simply bringing it to the boiling point, and, after cooling, keep the milk on ice. This will destroy germ life and reduce the chances of milk-borne diseases to a minimum.

Dr. H. W. Wiley's committee submitted the following recommendations:

1. That the milk which is supplied to infants under the age of 8 years in the District of Columbia should be certified by the health office. Milk should contain not more than 5,000 bacteria per centimeter, should be not more than 12 hours old, and should be delivered in artificially cooled packages.

2. That the health officer of the District be authorized to advertise for dairies which will be willing to so modify their barns, stables, etc., if necessary, as to secure a license from him for the production of certified milk under the most improved sanitary conditions.

3. That each cow furnishing the milk in the dairy be tested, under the supervision of the health officer, for tuberculosis or other contagious or infectious diseases; and that any animal so suffering be excluded from the herd.

4. That a daily sample or samples drawn from the supply of each certified milk furnished to the city be secured for the purpose of making the bacterial count and determining the chemical composition, etc.

5. That parents and guardians be urged to use only certified milk, at least for infants' food, in the District of Columbia for all infants under the age of 8 years.

6. That if private dairies can not be induced to furnish certified milk, the Commissioners of the District of Columbia, as a health measure affecting in the highest degree the welfare of the District of Columbia, be asked, if it can be legally done, to establish a municipal dairy for the purpose of furnishing certified milk for the use of infants under 3 years of age.

7. That pending the time which must necessarily elapse for the inauguration of a service of certified milk for infants' use, the health officer be authorized, as a result of inspection, to publish a list of dairies from which the milk supply is drawn, giving the average rating of each dairy, the chemical composition, and bacterial count of the samples.

8. That for the purpose of securing modified milk for infants in ill health, according to the prescription of physicians, the milk commission of the Dis-

* The classification referred to is as follows: Class 1, certified milk for infants, as hereinbefore described. Class 2, clean, raw milk from healthy cows, as determined by the tuberculin test and veterinary physical examination; the cows to be housed, fed, and milked under good conditions, but not necessarily equal to the conditions provided for in class 1; pure water, as determined by chemical and bacteriological examination, to be provided; the bacteriological count of the milk not to exceed 100,000 bacteria per cubic centimeter, at the time the milk reaches the city, at any season of the year, as determined by the health department at frequent intervals; milk to be delivered to the customer in sterilized containers, to be filled upon the dairy farm, and the temperature of the milk not to exceed 50° F. until delivered to the customer.

trict Medical Society be requested to secure the establishment of a laboratory, under its supervision, in which only certified milk shall be used, and in which, by the use of a separator or otherwise, milk of a definite chemical composition may be prepared from certified milk, in harmony with the physicians' prescriptions relating thereto.

9. That a complete chemical and bacteriological laboratory be established in connection with the health office, of a capacity to examine all the samples necessary to secure the certified and modified milks above described.

10. That the term "certified milk," as used herein, is to be applied to milk secured at dairies subject to a periodic inspection, and the products of which are subjected to constant analysis. The cows providing the milk are properly fed, free from tuberculosis or other contagious diseases, and housed in clean stables, properly ventilated, and they are supplied with wholesome water and food, and kept clean. The milk is drawn under precautions to avoid infection, is immediately strained and cooled and packed in sterilized bottles, which are kept at a temperature not to exceed 50° F. until delivered to the consumer.

It is fully realized that milk of this character will cost more to produce and should bring a higher price in the market than ordinary uncertified milk. At the same time it is hoped that the producers of milk will endeavor to keep the prices within the means of the ordinary citizen while making a fair profit on their invested capital.

In the language of Professor Harrington, "the public needs proper education that clean milk is a necessity, and that infant sickness and funerals can be reduced at least 40 per cent. * * * A model farm properly manned certainly can not compete on equal terms with a filthy farm, where no attempt is made to conduct the business in a decent manner, especially if customers are indifferent. The dirty producer can even afford to cut prices and take customers away from the other, if customers care to save a cent and make it up in pus and cow dung."

HOME TREATMENT OF NURSERY MILK.*

The milk, as soon as delivered, should be placed in a refrigerator upon ice, so that the temperature may not exceed 50° F. If desired for infant feeding, it should stand for one hour, when the upper third (10 per cent top milk) can be taken off. This top milk is then modified, so that the proportion of the constituents may be those of human milk. This is done by mixing 7 ounces of the top milk with 1 ounce or 2 tablespoonfuls of milk sugar, the same quantity of lime-water, and 12 ounces of boiled water. If only 10 ounces be required for twenty-four hours' feeding, the proportion of each ingredient is reduced one-half; if 30 ounces be necessary, add one-half. In case the child presents evidence of feeble digestion, the amount of fats and proteids must be reduced by cutting down the top milk to 6, 5, 4, 3, or even 2 ounces, and sufficient boiled water added to make 20 ounces. After modifying the milk in the manner directed, the correct amount of each feeding is put in a nursing bottle. The necks of the bottles are stopped up with plugs of clean nonabsorbent cotton.

The milk should then be pasteurized. For this purpose different pasteurizers have been placed on the market. A very simple and inexpensive method is to place the bottles in a tin kettle, pour warm water around them, and bring the water to a temperature of 180°. The kettle is then covered and removed from the stove, wrapped in

* This infomation is obtained largely from Prof. Henry D. Fry's monograph on "Maternity," Washington, 1907, a work which can be confidently recommended.

a piece of flannel blanket, and set upon folded newspapers. At the expiration of half an hour the bottles should be taken out, cooled, and kept on ice until used. When it is time to feed the baby, one of the bottles is removed and set in hot water until the temperature of the milk is 98°. A higher or lower temperature is absolutely injurious to the infant.

QUANTITY OF FOOD FOR EACH FEEDING.

The number of feedings in twenty-four hours has been given on page 190. Doctor Fry believes that a frequent cause of failure to raise babies on modified milk is that they are overfed. He considers 1 to 2 tablespoonfuls sufficient for each feeding during the first few weeks of life. At 1 month of age give 2 to 3 tablespoonfuls; at 6 weeks 3 to 4 tablespoonfuls; at 2 months 4 to 5 tablespoonfuls. Increase the quantity at the rate of 1 ounce each month up to 6 months of age. Two tablespoonfuls make an ounce. Another trouble is the baby gets the food into its stomach too fast. When nursing at the breast the baby requires from fifteen to twenty minutes to suck the nourishment. When fed with the bottle it often obtains its food in five minutes.

In this connection it should be remembered that no substitute for human milk as yet prepared can take the place of a sound mother's milk, and that as long as we are compelled to resort to infant feeding we should feel our way gradually, bearing in mind Biedert's conclusions, that a bottle-fed infant thrives best when the minimum amount of food necessary for development is given. If in the course of feeding symptoms of diarrhea with green stools appear, it is best to stop the milk altogether and feed the baby with albumen water, barley water, or rice water, and consult a physician at once.

Barley water is made as follows: Take 2 tablespoonfuls of pearl barley, add 1 quart of water, boil for three hours, add enough water to keep the quantity to 1 quart, strain through course muslin. Keep well covered in refrigerator, warm to 98° before using it. Rice water is made in the same manner.

CARE OF THE NURSERY REFRIGERATOR, NURSING BOTTLES, NIPPLES, UTENSILS, ETC.

"It is absolutely essential that intelligent and careful attention should be paid at home to the cleanliness of bottles, nipples, dippers, cooking utensils, etc. The nursery refrigerator must be metal lined and kept clean, aired free from odors, and well supplied with ice (unless the place in which it is kept has a temperature less than 50°).

The bottles can be cleaned as follows: Rinse with the brush in cold water in which a little washing soda is dissolved, then wash and brush thoroughly with soap and hot water and rinse again in sterile water. Or the bottles as soon as emptied can be filled with cold water to which a little bicarbonate of soda is added. Before being refilled they should be thoroughly washed with a brush and hot soap suds and then boiled for twenty minutes. * * * Never let a nursery bottle stay dirty after use until the milk dries in it. The neck of the bottle should be large enough to permit easy cleaning and it should have no corners or angles on the inside. The nipples

should be of rubber and made so that they can be easily turned inside out for cleaning. New nipples should always be boiled before use. Immediately after use the nipples should be washed in soda water and kept in a solution of boric acid, and when wanted again they should be rinsed in water. Attention to these details should not be neglected, as the life of the infant depends upon absolute cleanliness of the food at all times, and especially during the warm months."

From what has been said on this subject it is evident—

1. That no effort should be spared to secure the enactment of more stringent laws regulating the production and sale of pure milk and cream.

2. The establishment of day nurseries, where the infants of those who are obliged to go out to their work may be properly cared for, is urgently called for.

3. The establishment of dispensaries, where intelligent instructions are given in infant feeding and modified milk sold at reasonable rates, would be in the interest of public health and humanity.

It is gratifying to note that such a dispensary was started April 13, 1908, in connection with the Neighborhood House in southwest Washington. According to Dr. William J. French, up to October 1, 1908, 261 infants and children have been treated. There were but 3 deaths. The records of the health office show that during 1907 there were 50 deaths in southwest Washington in children under 10 years of age, while during the year 1908 there were but 29 deaths in children of the same age period, in spite of the very hot summer. Doctor French very justly considers the clean, pure milk and the instruction furnished by the dispensary factors in this marked reduction of mortality rates.

CHAPTER V.

THE PREVENTION OF PERMANENT DISABILITIES IN CHILDHOOD.

The writer, in his sociological studies of physically defective persons who contribute such a large contingent to our charitable institutions, has felt convinced that many of these partial and complete disabilities could have been prevented by proper care and treatment in childhood. It is now well known that many of the joint deformities in children are amenable to treatment, and that a ruptured child or person may be radically cured. As a member of the Board of Charities he recommended that the physicians to the poor and agents of the Associated Charities be requested to encourage the parents of such children to authorize operative procedures or hospital treatment, for the prevention of permanent disabilities. The result within the past year more than justifies a general acceptance of these principles. The records of the Children's Hospital reveal the gratifying fact that the operations for the radical cure of hernia, for example, have increased from 9 in 1907 to 25 in 1908, and that every child was discharged as cured. The increase in the number of joint cases and deformities treated is also very marked.

In order to determine the number of physically defective children in our graded public schools the health officer and the board of education authorized a general medical survey of the pupils. The exami-

nation was conducted by the medical inspectors of the schools, under the general direction of Dr. Henry C. Macatee, assistant secretary of the President's Homes Commission. The results have been tabulated by him and will be found in Table A.

From this table we learn that out of 43,005 pupils in the graded schools 13,407 were colored and 29,598 were white. Among the colored children 3,784 instances of the defects listed in the table were encountered, or a relation of 28.2 per cent; among the white pupils 11,520 notations of defects, a relation of 38.9 per cent to the whole, were encountered. The difference in percentage of defects between white and colored children is solely due to better condition of the teeth in the colored children. Total defects noted, 15,304, or 35.5 per cent of the pupils examined. These percentages, high as they may appear, are very much lower than the rates reported from New York.

Omitting from this consideration the 6,698 pupils who probably needed only dental care—a matter of importance, however, to the general health—we still have to deal with 8,606 pupils, or 20 per cent of the total, whose physical condition should be a matter of grave concern to the parents. Of this number 149 were crippled, 272 deformed, 461 had strabismus (squint), 312 had discharging ears, 835 defective hearing, 2,176 defective vision, 2,062 were "mouth breathers," 703 were undersized, 727 ill nourished, and 934 were anæmic.

It was not deemed best to conduct physical examinations involving the removal of clothing, and hence the number of ruptured children could not be determined, but, judging from the reports of the agents of the Associated Charities, the number is sufficiently great for serious consideration.

It will be readily conceded that every crippled or deformed child should, if possible, be spared from permanent disability, and no thoughtful parent should hesitate to act when attention is directed to the serious consequences of neglect. Poverty is no excuse for the "do-nothing system," as the medical charities offer adequate facilities for treatment of persons unable to pay for the same.

Nor is there an excuse for not attempting to cure discharging ears, defective hearing or vision, since every observer is familiar with the sad consequences of such defects in the ultimate struggle for existence. Parents may not know that a child afflicted with a squint, harelip, or cleft palate may be transformed into a vicious character, because it is the object of constant ridicule within and without school, and that all of this could be avoided by a timely operation. Parents are probably not aware that many of the nervous affections and even mental defects in boys are due to some slight malformation of the genital organs, for which the Hebrews instituted circumcision. Nor is it generally known that anæmic and ill-nourished children and those suffering from enlarged tonsils, cervical glands, or post-nasal growths, and the majority of "mouth breathers" are peculiarly susceptible to disease in general and to tuberculosis in particular.

Lastly, there is no good reason why special attention should not be given to the physical development of undersized children or those affected with slight muscular deformities, which, if left uncorrected, will be a source of regret and even reproach to the teacher and parent.

The remedy lies chiefly in education, and for this purpose the study

of hygiene should be made an important part of the school curriculum. In this way the parents may be reached through the child. Instructive visiting nurses should be appointed for the schools, so that they may follow the child to the home and point out to the parents the desirability of securing prompt professional advice in all cases where it is indicated, and especially in instances where neglect is likely to result in permanent disability. In this general educational campaign the medical inspectors of schools, teachers, social-settlement workers, agents, and friendly visitors of the Associated Charities can render a distinct service to the child and the State.

TABLE A.—*Inquiry for the President's Homes Commission—Medical inspection of public school children, Washington, D. C.*

School	Anemic.	Crippled.	Deformed.	Ill nourished.	Mouth breather.	Strabismus.	Undersized.	Defective vision.	Defective hearing.	Discharging ears.	Subject to toothache in past year.	Total times defects noted.	Total enrollment.
WHITE.													
Corcoran	39	....	2	17	31	9	10	39	3	2	86	226	412
Weightman	29	....	....	8	12	1	5	22	6	1	53	139	376
Industrial Home School	11	....	3	1	6	3	1	18	3	.....	27	68	134
Reservoir	13	....	....	.....	6	2	1	6	2	.....	23	53	127
Conduit	2	....	....	.....	.....	.....	.....	.....	.....	.....	12	14	24
Tenley	28	3	1	6	15	5	8	16	4	.....	78	159	278
Curtis	24	1	5	6	19	5	7	28	13	2	76	187	389
Addison	11	2	1	4	18	5	3	10	5	1	56	116	319
Hyde	9	....	1	1	14	1	6	13	1	5	20	67	341
Fillmore	14	....	1	1	19	3	4	2	1	.....	72	117	272
Jackson	9	2	2	1	20	3	4	7	3	.....	104	165	313
Hamilton	5	....	....	7	1	1	1	6	1	.....	5	27	114
Benning	3	....	....	2	3	.....	1	9	.....	.....	5	23	127
Edmonds	8	2	....	1	17	2	2	25	13	6	78	154	377
Taylor	9	1	....	.....	6	2	4	46	19	10	105	202	323
Maury	7	2	1	.....	5	.....	3	20	7	1	19	70	369
Madison	11	....	....	.....	5	.....	1	21	7	3	65	113	312
Blair	13	....	....	2	4	3	2	8	9	1	3	45	329
Blow	2	1	....	10	7	.....	4	15	9	3	18	69	206
Webb	16	4	....	5	7	2	2	13	3	2	9	68	333
Ludlow	4	1	....	2	6	3	1	14	5	11	109	156	305
Pierce	7	....	1	2	4	2	4	14	2	2	33	121	367
Kenilworth	.....	....	....	.....	2	1	.....	10	5	.....	13	31	101
Wheatley	10	....	1	2	4	2	2	15	10	14	62	122	359
Eckington	3	2	....	1	14	3	9	17	6	.....	36	91	340
Brookland	.....	1	3	.....	18	.....	13	12	2	.....	71	120	414
Langdon	.....	1	....	1	16	1	7	10	4	1	41	82	278
Emery	1	3	1	2	48	2	13	27	4	.....	95	191	621
Abbot	3	3	2	4	23	.....	12	41	12	4	69	178	399
Twining	3	2	1	2	15	2	16	18	16	1	25	101	312
Gage	3	....	....	.....	43	2	13	20	3	.....	10	124	468
Henry	1	2	....	3	37	.....	.....	13	3	.....	14	73	501
Polk	.....	....	....	1	20	.....	1	36	11	3	42	114	413
Morse	1	1	1	.....	21	5	16	33	8	2	42	139	334
Seaton 1	2	....	....	6	27	2	20	28	17	3	32	166	407
Hayes	2	....	1	1	21	2	11	14	4	.....	52	108	299
Stanton	.....	1	....	.....	15	.....	.....	2	1	.....	18	37	142
Van Ness, J. P.	.....	3	....	1	33	5	.....	12	6	3	72	135	318
Ketchem	1	....	....	.....	45	4	.....	24	9	6	30	109	301
Van Buren	2	....	....	.....	16	1	.....	23	1	1	41	85	76
Van Buren Annex	.....	3	....	.....	32	.....	.....	20	12	2	37	156	328
Bradley	4	4	....	.....	48	5	.....	25	16	6	143	251	376
Potomac	1	....	....	.....	25	2	.....	8	6	4	47	93	138
Smallwood	8	2	1	4	31	5	.....	27	7	3	104	192	400
Amidon	3	....	2	1	31	.....	.....	30	19	7	98	191	405
Jefferson	23	2	1	.....	56	3	1	56	22	15	166	345	810
Bowen, S. J	5	3	1	3	40	7	1	47	26	11	102	216	368
Greenleaf	19	1	2	3	36	6	.....	25	7	5	103	207	391
Congress Heights	1	....	....	.....	38	3	.....	37	9	6	104	198	347
Cranch	18	7	4	8	39	19	7	37	10	3	110	276	602
Tyler	11	3	1	1	18	5	3	17	8	7	68	137	366
Buchanan	8	4	1	9	22	7	2	12	12	14	91	183	414

TABLE A.—*Inquiry for the President's Homes Commission—Medical inspection of public school children, Washington, D. C.*—Continued.

School.	Anæmic.	Crippled.	Deformed.	Ill nourished.	Mouth breather.	Strabismus.	Undersized.	Defective vision.	Defective hearing.	Discharging ears.	Subject to toothache in past year.	Total times defects noted.	Total enrollment.
WHITE—con.													
Orr	8	1	....	4	18	1	5	8	5	2	23	86	202
Lenox	14	3	1	6	29	5	4	29	18	6	130	245	376
Dent	16	2	1	8	30	6	3	30	9	5	154	273	380
Brent	19	2	1	3	21	6	6	40	28	3	30	158	219
Wallach	18	1	....	6	54	11	10	44	19	1	73	226	291
Towers	19	2	....	4	35	9	11	31	16	27	190	354	424
Peabody	26	2	2	5	40	10	13	37	20	6	144	304	388
Hilton	18	1	1	5	18	7	13	25	8	1	81	178	276
Carbery	17	....	1	10	56	2	10	14	4	10	96	220	286
Thomsen	....	1	....	....	3	....	....	....	5	2	6	17	208
Force	4	2	....	1	21	4	3	17	15	....	3	70	223
Webster	3	1	3	2	25	2	4	28	12	1	19	91	554
Grant	2	3	....	3	40	4	6	7	4	1	23	93	456
Gales	1	....	....	4	31	1	1	18	13	3	57	130	426
Arthur	5	1	....	5	35	4	6	5	5	....	64	130	345
Toner	3	1	1	6	24	6	3	3	4	1	50	103	266
Blake	2	....	1	....	18	3	7	4	1	....	52	88	294
Hubbard	4	1	....	....	30	1	1	6	2	....	66	111	263
Petworth	8	....	....	3	20	....	2	8	4	1	88	144	347
Brightwood Park	....	....	....	....	14	1	1	4	1	3	19	43	107
Takoma[a]	4	....	....	....	18	1	1	2	2	....	49	77	273
Morgan, T. P	1	....	1	....	3	1	....	5	2	....	107	120	459
Harrison	2	....	2	1	13	2	2	2	2	1	78	105	304
Dennison	3	1	1	....	6	2	1	8	5	....	72	99	424
Adams	2	....	....	1	11	....	1	2	2	2	67	88	339
Woodburn	1	....	....	1	3	....	....	3	3	....	18	29	108
Phelps, I	7	....	....	3	18	4	8	6	2	1	90	135	349
Brentwood	8	....	....	3	14	....	1	3	3	....	42	74	194
Monroe	13	1	1	1	37	2	2	7	5	1	97	167	389
Johnson	4	....	....	....	30	3	2	4	6	....	136	193	526
Ross	10	....	....	....	44	2	2	14	5	....	112	189	478
Franklin	12	....	....	1	12	4	6	28	14	1	26	103	367
625 Q street, Atypical	....	1	1	1	12	....	2	3	....	1	....	21	26
Chevy Chase	....	2	....	....	19	1	1	1	2	....	33	59	244
Berret	2	2	....	....	18	....	5	4	4	....	52	89	249
Twelfth Street Kindergarten	1	1	....	1	1	....	1	1	....	....	....	6	21
Total (miscellaneous, 2)	555	99	89	217	1,898	251	375	1,492	656	261	5,574	11,520	29,598
COLORED.													
Magruder	5	10	1	3	4	2	5	19	7	1	18	75	286
Slater	29	1	14	4	3	7	17	26	6	4	24	137	280
Langston	10	1	2	14	7	8	19	16	5	....	18	100	252
Douglass	10	1	13	21	5	32	8	20	7	2	50	172	374
Lovejoy	13	....	7	33	5	41	22	27	5	1	57	211	456
Ivy City	....	....	8	12	1	4	4	6	1	3	43	82	123
Ab. Simmons	1	....	29	29	9	14	12	15	3	....	78	190	317
Jones	4	....	12	13	2	7	8	18	....	....	2	66	276
Logan	1	....	10	9	6	17	19	27	2	....	20	111	265
Deanwood	....	....	3	5	....	2	4	8	....	....	15	37	220
Benning Road	....	1	1	1	....	....	1	1	....	....	7	12	108
Payne	....	3	16	26	3	10	26	14	2	....	41	141	322
Wilson, Ily	....	2	5	9	2	4	1	10	....	....	3	41	263
Chain Bridge	....	....	....	1	2	1	....	4	....	....	....	....	31
Reno	....	1	....	....	5	....	....	9	3	....	29	47	145
Sumner	....	1	....	....	3	2	2	10	3	....	12	33	192
Miner	....	3	....	1	5	1	3	11	4	....	5	33	358
Montgomery	5	....	2	29	3	4	5	17	1	....	6	72	334
Briggs	6	1	2	5	14	9	2	22	6	1	17	85	394
Stevens	8	3	9	17	5	12	5	50	4	2	43	158	309
Phillips	1	....	7	13	6	6	7	17	6	....	11	74	237
Wormley	3	....	3	11	2	4	6	9	2	....	12	52	258
A. Lincoln	12	....	5	15	6	....	12	48	16	....	76	190	390
Bell	10	....	7	6	8	1	14	30	12	11	73	181	367
Giddings	10	2	1	7	2	....	20	14	4	1	36	117	347
Randall	9	2	8	11	1	....	14	25	1	2	54	126	488

[a] Takoma first grade not included.

TABLE A.—*Inquiry for the President's Homes Commission—Medical inspection of public school children, Washington, D. C.*—Continued.

School.	Anæmic.	Crippled.	Deformed.	Ill nourished.	Mouth breather.	Strabismus.	Undersized.	Defective vision.	Defective hearing.	Discharging ears.	Subject to toothache in past year.	Total times defects noted.	Total enrollment.
COLORED—cont'd.													
A. Bowen	9	1	6	3	4	2	10	18	5	5	55	118	297
Birney	7	3	7	8	9	1	13	49	16	2	61	176	470
Ambush	12	.....	.....	10	3	.....	21	33	14	6	75	174	320
Cardoza	8	.....	5	14	3	3	10	29	11	2	60	145	404
Syphax	21	.....	7	15	9	2	15	8	12	2	67	158	343
Garnet	13	2	3	14	7	4	5	13	4	2	3	70	394
Mott	10	2	3	25	4	3	3	8	2	1	6	67	523
Banneker	12	.....	2	19	6	.....	.....	8	4	1	9	61	355
Cook	9	3	4	23	2	1	2	9	3	.....	2	55	389
Bruce	5	1	2	17	2	1	2	1	1	.....	2	34	222
Garrison	10	2	1	9	2	.....	2	5	2	.....	5	38	423
Patterson	19	1	2	34	1	4	6	12	.....	1	3	83	497
Military Road	2	1	1	6	.....	.....	.....	3	.....	.....	1	14	96
Fort Slocum	1	.....	1	.....	.....	.....	1	1	1	.....	.....	5	51
Orphans' Home	1	1	1	3	1	1	2	3	4	1	.....	18	73
Garnet Atypical	1	1	2	1	1	.....	.....	.....	.....	.....	.....	6	13
St. Luke Atypical	2	.....	1	1	1	.....	.....	1	.....	.....	.....	6	14
Total	279	50	213	510	164	210	328	684	179	51	1,124	3,784	13,407
Grand total	934	149	272	727	2,002	401	703	2,176	835	312	6,698	15,304	43,005
Per cent relation to total examined:													
White	2.21	0.33	0.19	0.73	6.41	0.84	1.20	5.04	2.21	0.88	18.83	.....	.....
Colored	2.08	.37	1.58	3.80	1.22	1.56	2.44	5.10	1.33	.38	8.38	.....	.....
All	2.17	.34	.63	1.69	4.79	1.07	1.63	5.06	1.94	.72	15.67	.....	.....

	Per cent
Defects, exclusive of toothache, occurred in—	
White	20.06
Colored	19.84
All	20.01
All defects occurred in—	
White	38.92
Colored	38.23
All	38.88

CHAPTER VI.

THE HEALTH OF THE CITY OF WASHINGTON.

In speaking of the health of a given locality it has always been deemed necessary that the climatic and telluric conditions should be considered. For the purpose of a comparative study I requested Prof. Willis L. Moore and Prof. A. J. Henry, of the United States Weather Bureau, to furnish me with meteorological data covering a period of thirty years for the city of Washington and six other cities where the climatic conditions are quite similar to those which obtain in this city. A careful analysis of these data and a study of the comparative mortality statistics justify the conclusion that there is absolutely nothing inimical to health in the climate of Washington. It was found, however, that although the city enjoys practically the same climate as Cincinnati, Indianapolis, Detroit, Philadelphia, Spring-

field, and Kansas City, it has the highest death rate[a]—22.8 per 1,000—Philadelphia coming next with a rate of 21.2 per 1,000, while Detroit, Kansas City, Indianapolis, and Springfield have an average of 17.5 per 1,000.[b]

As a matter of record, Doctor Busey, in one of his addresses, quotes the Washington Gazette of 1791, that "during that year, in a population of 2,000, but 7 deaths occurred in this city." If, then, during succeeding decades, "fatal epidemics of bilious fever, intermittent bilious fever, and bilious dysentery," and typhoid fever occurred, and the reputation of the National Capital as regards health conditions has suffered, it can not be the effect of climate, but of something added to the climate, and students of the subject have long since recognized that, apart from temperature, humidity, atmospheric pressure, winds, sunshine, and other meteorological conditions, there are many factors—such as soil, water, impure air, the presence of insects, social and racial problems—which play an important rôle in the healthfulness of a given locality.

It can be safely asserted that a number of causes have operated in the production of insanitary factors in the National Capital.

The topography of the basin in which the city is located was undulating, interspersed with small valleys, ravines, morasses, and lowlands subject to periodical overflows. The lowlands, according to Doctor Busey, "spread south of the F street ridge to the river shore, including a greater part of the White Lot and the Mall, and in the section known as 'the slashes,' lying along the northern boundary from the Tiber to Rock Creek, and dipping in many places far into the interior of the basin. When the city was first platted there were no Potomac and Anacostia River flats; the formation of the Potomac marshes is attributed to the construction of the Anacostia causeway in 1805 and the building of the Long Bridge in 1808, and the Anacostia River flats to the construction of the Kentucky Avenue Bridge in 1795 and the Bennings Bridge in 1797." Whatever their cause may have been, they increased from year to year by continuous depositions and soon became notorious breeding grounds for mosquitoes and the chief source for the propagation of malaria. The Potomac flats have been reclaimed since 1882, adding about 621 acres to our parking system, but the Anacostia River flats, which cover an area of over 1,000 acres, the title to which is vested in the United States, still continue to be a menace to the health of our inhabitants. The reclamation of the Potomac flats has greatly reduced the prevalence of malaria, as shown by the statistics of the health department, and it is reasonably and scientifically correct to maintain that similar results would follow the reclamation of the Anacostia flats. Take away the mosquito-breeding places of every description and there will ne no extra corporal habitat for the germs of malaria. It is a deplorable fact that, although this measure has been urged by the Commissioners since 1894, no legislative action has yet been taken.

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[a] Of these seven cities Washington had the highest death rates from malarial and diarrheal diseases, typhoid, and consumption (Philadelphia exceeding in pneumonia).

[b] Considerably less than the general death rate in the registration area in the United States, representing 10,000,000 inhabitants. For the census year 1900 this was 18.6 per 1,000.

RELATIONS OF WATER SUPPLY AND SEWERS TO HEALTH.

Prior to the introduction of Potomac water in 1859 the inhabitants had to depend upon springs, pumps, wells, and cisterns subject to pollution from sewage of cesspools, vaults, and box privies. It was the old story of wells and privies being dangerous neighbors and failure to recognize the necessity that a system of public sewerage must go hand in hand with the public water supply, the neglect of which compels recourse to various makeshifts, and must inevitably lead to pollution of soil, water, and air. There can be no question that these factors have played an important rôle in the causation and spread of typhoid fever, dysentery, diarrhea, and other intestinal infections, and have served to swell the general mortality rates. Many of these conditions have been improved, a comprehensive system of sewerage disposal has been adopted within the city limits, and the number of public pumps has been reduced from 171 in 1895 to 42 in 1908. The number of private wells, however, is a matter of conjecture.

It may be urged that with the introduction of a purer water supply in 1859, health conditions, especially as regards the so-called "water-borne diseases," should have improved, but it is a long and tedious matter to convince the average man that a clear, sparkling and very palatable pump water in cities may be, and very frequently is, liable to the grossest forms of pollution. He knows from observation that hydrant water is at times absolutely filthy from suspended matter, and that it reaches in summer a temperature which is far from palatable. But he does not know that the well water in its passage may have simply been deprived of the suspended matter, without losing some of the most dangerous forms of disease germs. It involves, therefore, many years of education to impress the public with the dangers of pumps, and, by the time this was fairly well accomplished (although many even now are still in doubt) the Potomac River, by reason of an ever-increasing population in the towns, villages, and settlements located along the banks and within its watershed, had become itself a dangerous source of infection.

My suspicions that typhoid-fever germs might travel all the way from Cumberland, a distance of 134 miles, and infect the consumers of Potomac water in Washington, were confirmed as early as the winter of 1889–90 by studying the effects of the typhoid-fever epidemic at Cumberland upon the prevalence of the disease in Washington. The records of the health office show that during this epidemic, from December, 1889, to April, 1890, the deaths from typhoid fever amounted to 74, as compared with 42 for the corresponding months of the previous year. Indeed, we had almost double the number of typhoid deaths during these months than for any corresponding months either before or since this epidemic. Cumberland had about 45 deaths and 485 cases. Washington had 74 deaths and about 800 cases, and yet the starting point of all was the excreta of one patient washed into a little run which empties into the Potomac River 300 feet above the pumping station of the water supply for Cumberland. In the face of this fact and the almost constant presence of intestinal bacteria in Potomac water, the writer had no hesitation in declaring that the excessive typhoid-fever rate of the National Capital

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was largely due to contaminated Potomac water, and urged, with other members of the profession, the speedy purification by means of sand filtration, as well as the prevention of river pollution.

FILTRATION OF THE POTOMAC WATER.

In 1901 and subsequent thereto Congress appropriated sufficient money for a complete system of slow or natural sand filters. This filtration plant was completed under the supervision of United States engineer officers, with Allen Hazen as consulting engineer, in the fall of 1905. It covers 29 acres and is the largest in America, and in many respects the most modern and scientific in the world. It handles about 75,000,000 gallons a day and eliminates 98 to 99 per cent of all the bacteria; and we have at least the comforting assurance that a corresponding percentage of disease-producing germs will also be removed. The effects of filtration upon the typhoid fever rates are shown by the fact that the rate reached as high as 104 in 1890, and was still 60.3 during the five-year period 1896–1900, but has fallen in 1907 to 34.6 per 100,000. As a result of the installation of filtration plants elsewhere, not only a reduction of 81 per cent in the deaths from typhoid fever has been noted, but also a marked reduction in the general death rate. Computations by Hazen clearly indicate that where one death from typhoid fever has been avoided by the use of a better water, a certain number of deaths, probably two or three, from other causes, have been avoided.

It is a difficult matter to explain how water is connected with the deaths other than those from water-borne diseases, yet when we consider that water enters into the composition of the body to the extent of about 60 per cent, we are in a position to appreciate the sanitary acumen of Aristotle when he wrote in his Politica:

> The greatest influence upon health is exerted upon those things which we most freely and frequently require for our existence, and this is especially true of water and air.

INFLUENCE OF SEWERS UPON THE HEALTH OF THE COMMUNITY.

According to D. C. McComb, superintendent of sewers, "the first action materially affecting the drainage of the city was the construction of the Washington Canal, from the Potomac River at the foot of Seventeenth street west to the Anacostia River at the foot of Second street east. The sewers constructed by the city prior to 1871 emptied into the canal. * * * After the introduction of the Potomac water supply in the year 1859 the demand for and the construction of sewers increased, and it was not long before complaints were made of the nuisance caused by the foul materials brought by these sewers to the canal. * * * It was not until the act of the legislative assembly of August 21, 1871, that the discharge of solids into sewers was permitted, although in point of fact water-closets with direct sewer connections were in use for many years prior to the passage of this act."

As a result of these conditions, the board of health, in 1871, found not only over 30,000 privy boxes, "many in bad condition and overflowing," the contents of which were emptied, according to Doctor

Tindall, upon the commons of south Washington, within less than 1 mile from the best residence and business section of the city, but also that the Washington Canal, which L'Enfant had hoped to preserve as a natural waterway, had become, in the language of Professor Henry, of the Smithsonian Institution, "an open cesspool, a fruitful source of discomfort and disease, receiving the sewage direct in its midst, and inconsistent with the intelligence of the age." This great nuisance, passing within a few hundred yards of the White House, the War, Navy, and State Departments, through the Agricultural, Smithsonian, and Botanical gardens, almost to the very gates of the Capitol, was abated in 1871–1880, upon the demands of the board of health.

It is safe to say that the District prior to 1871 spent less than $100,000 for sewers. We now have 103.2 miles of main sewers and 365.2 miles of pipe sewers, constructed at a total cost of $13,613,932.38. Provisions have never been adequate, however, and the records of the health department show that even now in about 4,100 houses sewer connections can not be made because of the absence of branch sewers.

A summary of the evidence reveals the significant fact that the cities, both at home and abroad, in which there has been the most marked decrease in typhoid fever are those in which a pure water supply has been substituted for a preexisting contaminated one, and the effects are still more marked when combined with a good sewerage system.

The history of every sewered town shows a lessening of the typhoid death rate subsequent to the construction of the sewers, and that the typhoid rate is always higher in sections supplied with makeshifts. In 1895 the writer pointed out that typhoid prevailed in the city of Washington in 1 of 81 houses with privies and in only 1 in 149 of those connected with sewers. The health officer of Nottingham, England, has since then presented similar evidence. The only reasonable explanation for this is that sewers carry away the filth that otherwise would contaminate the soil and ground water, but even if there were no wells these makeshifts are still a source of danger in so far as they favor the transmission of the infection by means of flies, nor can the possibility be ignored that the germs in leaky or overflowing boxes may reach the upper layer of the soil and, with pulverized dust, gain access to the system.

HAS HUMAN LIFE BEEN PROLONGED BY EFFORTS IN SANITATION?

Professor Finkelnburg, of Bonn, estimates that the average length of human life in the sixteenth century was only between eighteen and twenty years, and at the close of the eighteenth century it was a little over thirty years, while to-day it is between thirty-eight and forty years; indeed, the span of life since 1880 has been lengthened about six years. No two factors have contributed so much to the general result as the improvement of the air we breathe and the water we drink. Indeed, we have ample evidence that, with the introduction of public water supplies and sewers, the general mortality in numerous cities during the past fifty years has been reduced fully one-half, the good effects being especially shown by a marked decrease in the number of cases of typhoid fever, diarrheal diseases, and consump-

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tion. The vital statistics of Great Britain furnish the proof,[a] and our experience with American cities confirms this conclusion.

The death rate in London has been decreased from 40 per 1,000 in 1780 to 15.1 per 1,000 in 1905; in Berlin, from 32.9 in 1875 to 16.4 in 1904; in Munich, from 41.6 in 1871 to 18 in 1906; in Washington, from 28.08 in 1875 to 19.25 in 1907; and in New York, from 38 per 1,000 in 1854 to 18.9 in 1906. The general mortality in the United States has been reduced from 19.6 in 1890 to 16.2 per 1,000 in 1905, which means a saving of over 200,000 lives in one year alone.

To demonstrate the beneficent effects of sanitary reforms, the following comparative illustration, which I gathered from one of the public addresses of my deceased friend, Doctor Busey, and have brought up to date, may be cited:

In 1872 the cities of Berlin and Washington were alike in primitive municipal methods of sanitation. Without adequate distribution of the water supply, the larger part of their population was dependent upon public and private wells. Without systems of sewerage, both were alike supplied with makeshifts for the disposal of human excreta and waste waters. The unpaved streets were the common receptacle of garbage, ashes, and house sweepings, and along the gutters the surface and house drainage were conducted to the neighboring water courses. Since the city of Berlin began the system of sanitary improvements, completed in 1890, at a cost of 50,000,000 marks for a pure and ample water supply and 42,500,000 marks for construction of sewers, the typhoid fever death rate has fallen from 143 in 1872 to 5 in 1890 per 100,000 of its inhabitants, and the general death rate from 32.9 in 1875 per 1,000 to 16.4 per 1,000 in 1904; while our death rate from typhoid fever is still seven times greater than that of Berlin, our general death rate has been reduced from 28.08 in 1875 to 19.25 in 1907—results not so much due to climatic differences, but largely due to the fact that the German capital enjoyed superior advantages in sanitation and the housing problem, while we are still in the process of evolution, and are making slower progress on account of the mixed character of our population.

The writer, however, is not a pessimist as regards the health of this city, since a retrospect conclusively shows that the efforts of Senator Gallinger and other Members of Congress, the Commissioners, and the health department in the sanitation of the national capital have been most fruitful and beneficent.

DECREASE IN DEATH RATES SINCE 1875.

When we recall the fact that in 1875 the death rate for the white population was still 21.04 per 1,000, while in 1907 it was only 15.54,

[a] The following table shows the death rate from certain diseases per 10,000 of population in English cities before and after the introduction of sanitary works (see Cameron, "A Manual of Hygiene," 1874, p. 129):

City.	Before sanitary works.			After sanitary works.		
	Typhoid fever	Diarrhea.	Consumption.	Typhoid fever.	Diarrhea.	Consumption.
Bristol	10 0	10.5	31 0	6 5	9.1	25.5
Leicester	11 7	16 0	43 3	7.7	19 3	29 3
Cardiff	17 5	17 2	34 7	10 5	4 5	28 6
Macclesfield	14 2	11 0	51 5	8 5	9 0	35 3
Warwick	19 0	5.7	40 0	9 0	8 0	32 3
Stratford	12 5	11.2	26 6	4 0	5.7	26 5
Ashby	13 3	4.0	25 5	5.7	8 3	31.3
Dover	14 0	9.5	26.5	9.0	7 0	21.2
Croydon	15.0	10.0	.....	5 5	7.0	.....

and that likewise a steady and most gratifying decrease from 42.86 to 28.21 per 1,000 of the colored population has taken place, we have reason to look hopefully to the future.

In discussing the healthfulness of the national capital, it would not be just to the fair name of our city did we fail to emphasize the fact that the colored element is a potent factor in maintaining a high general death rate. For example, the mortality rate during the census year of 1900 in the larger cities of the registration area in the United States, representing 10,000,000 of inhabitants, surrounded by modern influences of civilization, was 18.6 per 1,000; our own rate for the white population was 17.81, and for the colored 30.43, making a general high average of 21.74. Our population is composed of 231,417 whites and 95,018 colored, which means that Washington includes the largest colored population in the world.

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CAUSES OF LARGE DEATH RATES AMONG THE COLORED RACE.

An analysis of the relative incidence of the most fatal diseases on the white and colored race shows that the excessive mortality is especially marked in pneumonia (ratio, 1 to 3.30), tuberculosis of the lungs (1 to 3), abdominal tuberculosis (1 to 4.10), pulmonary hemorrhage (1 to 6.13), diarrhea and enteritis under 2 years of age (1 to 2.96), and typhoid fever (1 to 1.79), and is higher in all other diseases, even in malarial affections (1 to 4.32), from which they were supposed to enjoy comparative immunity, the only exceptions being alcoholism, delirium tremens, and cirrhosis of the liver, in which the ratio is less than among the whites.

It is not an easy matter to account for this excessive mortality. In the first place, we can not say that transferring the African race to a temperate climate has improved its physical condition. Negroes in this and other temperate climates are extremely liable to tuberculosis and kindred affections. This must be attributed not only to climatic conditions, but also to the radical changes of living, both as regards habitation and food. The changes from the native shelter, with its natural ventilation, to the schoolroom and house, the abrupt change from native and simple food to the more refined flours and sugars, doubtless produce in the negro, as in the Indian, a vulnerability of the respiratory and gastric tract to the invasion of the tubercle bacillus and lessens his general power of resistance. All of the bad effects are accentuated when one race mingles with another, and, as a result, a tendency to degeneration manifests itself. Racial degeneracy has been defined as nonresistance to the influences inimical to the existence of the race. The individual, therefore, who can not resist the disease-producing causes which are about him, whether they be germs, climate, or whatever their nature, is physically degenerate. We see this especially manifested in the half-breed Indian and in the mulatto, neither of whom is scarcely ever as robust as either of the races from whence he came. The transplantation of the negro from his native soil, both in Africa and in the South, to less favorable environments as regards food and housing conditions, was not conducive to his physical welfare. The housing of the colored population has always been a disgrace to the national capital, and even now our alley houses and slums constitute the main shelter for nearly 20,000 of this class of population.

The rapid influx of a negro population during the civil war, estimated to have been between 30,000 and 40,000, imperatively demanded immediate accommodation. In consequence of this necessity hovels of every description arose, much of the material having been obtained from the abandoned army camps and hospitals.

In the report of the board of health for 1877, page 46, we read:

> No meaner cabins for temporary or permanent shelter can be found than some our wretched poor are born and exist and die in here at the capital of the United States. And, strange as it may seem, none so mean that they have not an owner mean enough to charge rent for them. Down in the alleys below grade, with combination roof of tar, felt, shingles, rags, tin, gravel, boards, and holes, floors damp and broken, walls begrimed by smoke and age, so domiciled are families with all the dignity of tenants having rent to pay.

This description, given thirty-one years ago, fits many of the habitations in this city to-day, and the influence of such homes upon death rates is shown by the fact that in 1906 the death rate among alley residents was 26.96 as compared with 18.75 among the residents of streets.

It is known that 90.54 per cent of our alley population are colored. It is not surprising, therefore, that during the past twelve years they have contributed 5,268 out of the 9,534 deaths from consumption.

Infantile diarrhea, for reasons given,* is also more prevalent in insanitary dwellings.

Here, again, the colored population, obliged as they are to find shelter in houses unfit for human habitation, contributed in the last six years 1,202 out of the 2,003 deaths from diarrhea and enteritis under 2 years of age. The mortality of children under 1 year of age is 115.5 per 1,000 among the white, and 331.86 among the colored. The white infantile death rate of 115.5 per 1,000 is lower than that of any of the 106 American cities, and also lower than that of 42 German cities tabulated by Professor Harrington, while the rate for colored infants is appalling.

It is likewise a noteworthy fact that, out of the 1,672 deaths from typhoid fever during the last ten years, 698 were colored and 974 white. The rate per 100,000 of population was 47.4 for the whites and 76.4 for the colored. Both rates are excessive, to be sure, but the factor of environment and other predisposing causes is plainly revealed by the undue fatality in the colored population.

Sufficient reference has been made to the influence of insanitary homes, but the mortality rate is especially excessive when combined with overcrowding. Hand in hand, and not infrequently as a result of such conditions, we also observe a greater amount of abject want, of filth, of crime, licentiousness, and other excesses which predispose to disease and even affect the unborn offspring.

I am not disposed to attribute all this and the general excessive mortality rate in the colored race to racial degeneracy, because many of the factors are sociological and to be found among the poor and ignorant everywhere. The colored element in Washington represents to a large extent those engaged in laborious work, probably the most exposed to hardships and inclement weather. Some allowance must be made for this in computation of the comparative death rates. The broad fact remains, however, that the average mortality rate in the seven cities which I selected, on account of similarity of climate, is

* Kober's Industrial Hygiene, p. 105.

18.01 in the white population and 27.12 for the colored element, and we may conclude that, while uplifting influences and higher standards of living are necessary among the least resourceful classes, regardless of race, they are especially imperative for the Afro-American. That his physical welfare responds promptly to improved environment is strikingly illustrated by a decrease in his general death rate from 42.86 in 1875 to 28.21 per 1,000 in 1907, and in the rate from consumption from 6.9 in 1878 to 4.5 in 1907.

REGENERATION OF HOUSING CONDITIONS.

The regeneration of the housing conditions and removal of slums does not concern a few well-meaning citizens alone, for the germs of typhoid fever may be carried by flies from a patient inhabiting one of the alley houses, often situated in the interior of a fine residence block, and contaminate the food and drink of neighboring homes. The contagion of diphtheria, scarlet fever, and tuberculosis may be spread by servants from these plague spots to the very best families.

The question involves both money and education; those who can not invest in sanitary homes can at least contribute their mite to the employment of trained agents engaged in the prevention of sickness and distress, or render, what is far better, some personal service in this uplifting work. Who can deny the influence of a friendly visitor in teaching his fellow-man the value of a clean home, proper food and cooking, and sober habits in the preservation of health and morals?

It is a lamentable fact that only about 1,500 of our residents are engaged in charitable and uplifting influences. The same men and women who subscribe to the Associated Charities, social settlements, playgrounds, summer outings, prevention of tuberculosis, day nurseries, visiting nurses to the poor, and other philanthropic agencies, have so far furnished the means for the erection of 240 buildings, which provide clean, healthful homes for 480 families. The wealthy men are not adequately represented, nor are the rank and file of our citizens.

THE PRESENT SITUATION.

It is not difficult to conceive that health officials appointed for a brief period and clothed with limited authority are decidedly handicapped in the conduct of their office, and as a result two such officers were found wanting in the control of the sanitary affairs of this city.

In 1895 our present health officer came into office, and it is due to his intelligent appreciation of the needs of the city that a number of sanitary laws and regulations have been framed and enacted. In fact, his efforts for the control of scarlet fever and diphtheria and for a more rigid system of food inspection, with special reference to the milk supply, with corresponding reduction in death rates, will stand out preeminently in the sanitary history of the city.

If it is deemed desirable that such important duties and responsibilities should devolve upon one man, he should be sustained by the strong arm of the law. This, however, in the very nature of our government, can not be, and the result is that the health office is not in a position to render the most efficient service. A health officer or board should be invested with full power from Congress to declare what shall be deemed nuisances injurious to health and to provide for the removal thereof, to make and enforce health ordinances, etc.,

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subject to the approval of the District Commissioners, and the appointments should be made, as in the case of the assessor or chief of police, during good behavior.

A health officer with an advisory board of health, with the supervising general of the Public Health Service as a member ex officio, would offer many advantages. The personal element would be entirely eliminated in the exercise of discretionary power and the health officer relieved from grave responsibilities in passing upon important problems and in the settlement of vexatious questions relating to the employment and discharge of subordinates and in the rigid enforcement of existing laws and ordinances.

Moreover, municipal hygiene is a progressive science, and the Commissioners and congressional committees would be relieved from the consideration of details in the formulation of sanitary legislation if these were acted upon by a board of experts. We do need more deliberative bodies, like the board of education and the Board of Charities, competent and willing to give to the commissioners and the public the benefits of expert knowledge without regard to compensation.

CONGRESS AND THE HEALTH OF THE DISTRICT.

The advocates of sanitary reforms and the improvement of housing conditions gratefully acknowledge the important services rendered by Senator Gallinger and other distinguished members of both Houses in the cause of sanitation of the national capital. Much has been accomplished, but more remains to be done before we can hope to place the healthfulness of this city on a par with some of the European capitals.

Congress, in the administration of the affairs of the District, has a sacred duty to perform. The General Government owns more than one-half of the property in the city, contributes more than one-fourth of the population in the way of officials and employees, not to mention the immense number of American citizens who annually visit the seat of government. In addition, Congress has permitted, during and after the war, 40,000 negro refugees to find shelter as best they could in our midst. For all this the United States simply pays one-half the taxes, no more; and no infrequently has paid less.

As sanitarians, we contend that in building a city, the capital of a gigantic nation, the first care should be the protection of the health of its people. Its beautifying is essential, but of secondary importance. Economy, however laudable its general purpose, should never be exercised at the expense of public health.

CHAPTER VII.

SEXUAL AND MORAL PROPHYLAXIS.

In this connection it may not be out of place to refer to diseases arising from impure sexual intercourse, whether it be a simple excoriation, which has been inoculated with some one of the septic germs, or whether it be an inflammation of the urethra produced by a specific discharge, or whether it be one of the forms of syphilis as now recognized.

The absence of reliable statistics in venereal diseases is very much to be deplored, for if we wish to approach the subject intelligently

we should know something more definite as to their prevalence in civil life.

An appropriate idea may be gotten by a study of army statistics. Doctor Munson (in his Military Hygiene, p. 823) gives the latest admission rate per 1,000 strength, as follows:

Germany	27.9	Austria-Hungary	61.0
Russia	36.0	United States	73.7
Japan	36.0	Great Britain:	
France	40.9	Home statistics	173.8
Holland	48.1	Indian statistics	522.3

Annual admission rate per 1,000 strength for the three years, 1890–1892 (Munson).

	Primary and secondary syphilis.	All other venereal diseases.
Germany	6.50	21.50
France	9.00	34.90
Russia	13.10	29.90
Italy	13.90	57.40
United States	16.83	57.98
Dutch troops (home statistics)	14.90	55.00
East Indies	47.00	408.60
British troops:		
Home statistics	101.70	101.90
Indian statistics	175.40	262.60

It is a lamentable fact that the very countries in which the sentiment, both in and out of the profession, is strongly against recognizing the evil, furnish the highest army rates, while in countries where some special regulations are in force preventing the spread of venereal diseases, such as weekly inspections of the men and periodical examination of the women engaged in prostitution, with compulsory isolation if such are found diseased, the army rates are lowest.

The comparative amount of army and civil venereal diseases is not known, because we have no statistics of the amount in civil life.

According to Fournier one-seventh of the population of Paris is syphilitic, and the mortality of infants born of syphilitic parents in many hospitals of that city reaches 84 to 86 per cent.

According to Doctor Weiss, there are 150,000 syphilitics in Berlin, or 12 per cent of the inhabitants.

In 1901 a committee of seven, under the auspices of the Medical Society of the County of New York, made an investigation into the prevalence of venereal diseases, and from the information received from private physicians, reports of the hospitals and dispensaries concluded that there were not less than 243,000 cases of venereal diseases treated in one year in that city. During the same year there were only 41,585 other cases of infectious of communicable diseases reported to the health department, viz, measles, 12,570; diphtheria, 11,001; tuberculosis, 8,877; scarlet fever, 7,787; chicken pox, 99. In other words, the morbidity from venereal diseases was nearly six times greater than that from all the above-named infectious diseases combined.

Parkes of England says:

It is a question whether a large number of the young men of the upper and middle classes do not suffer in youth from some form of venereal disease. In the lower classes it is perhaps equally common.

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Neisser, of Germany, holds that gonorrhea is, with the exception of perhaps measles, the most widespread of all diseases. Other German authorities have computed that fully three-quarters of the adult male population, and one-sixth or more of the adult females have contracted gonorrhea, and that 15 per cent of the population is syphilitic.

Dr. Prince A. Morrow, based upon a large personal experience and the results of the New York and Baltimore investigations by committees on sanitary and moral prophylaxis, says:

> Assuming from experience and the statistics collected in New York and in Baltimore that our population is more virtuous than that of Europe, it must be a conservative estimate that in this country the morbidity from gonorrhea would represent 60 per cent of the adult male population, and that of syphilis from 10 to 15 per cent, which would mean that between 3,000,000 to 4,000,000 cases are annually treated in this country. According to Morrow, 20 per cent of the cases occur before the twenty-first year, 60 per cent before the twenty-sixth year, and 10 per cent of the men who marry infect their wives. The report of the New York committee "would indicate that nearly 30 per cent of all venereal infections occurring in women in private practice in that city are communicated by their husbands;" and from his personal observation at the New York Hospital, extending over a period of several years, he concludes that "fully 70 per cent of all women who come therein for treatment were respectable married women who had been infected by their husbands."

VICE DISEASES IN THE DISTRICT OF COLUMBIA.

Dr. Henry C. Macatee, of the President's Homes Commission, has made a special study of the prevalence of so-called "vice diseases" in the District of Columbia. The results have been tabulated and will be found in Table B. The period covers nine years, except in the case of Providence Hospital, Columbia Hospital, and the Children's Hospital, for which institutions the data cover only two years. From this table it appears that out of a total of 274,611 patients treated 38,183 cases were vice diseases, viz, 9,869 syphilitic affections, 3,643 cases of chancroids, and 14,435 cases of gonorrheal affections. In addition to the 27,947 cases of sexual diseases there were treated 9,510 patients for alcoholism, 409 for delirium tremens, 256 for the opium habit, and 61 for the cocaine habit; an average of 4,243 cases per annum of vice diseases, or nearly one-seventh of all the cases treated in the city hospitals. As a matter of fact, 23.6 per cent of all the cases treated in the Washington Asylum Hospital and 31.6 per cent of those treated in the workhouse were vice diseases. The majority of the patients treated in the hospitals belonged to the dependent classes. We have no statistics as to the prevalence of vice diseases among the middle and upper classes.

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TABLE B.—*Cases of venereal diseases, alcoholism, opium habit, and cocaine habit treated at hospitals and dispensaries of Washington, and the relation these diseases bear to the total number treated.*

Institution and year.	All diseases.	Syphilitic affections.			Gonorrheal affections.								Alcoholism.	Delirium tremens.	Opium habit.	Cocaine habit.	Total vice diseases.	Per cent vice diseases.
		Syphilis.	Condylomata.	Tabes dorsalis.	Gonorrhea, including arthritis.	Salpingitis.	Ophthalmia.	Bubo.	Vulvitis and vaginitis.	Stricture of urethra.	Epididymitis and orchitis.	Chancroids.						
Washington Asylum Hospital.																		
1899	1,258	35	2	5	15				10	7	1	22	144		19		260	20.6
1900	1,417	67		3	23					3		10	244		3		355	25.0
1901	1,404	50		3	58	3				16	2	44	169		3		353	25.0
1902	1,257	68		6	33				8	18	3	9	118		7		270	21.4
1903	1,542	56	3	2	40				3	8	4	10	174	6	9		315	20.4
1904	1,669	66		1	31	1	1		2	10	4	13	391	28	19	8	575	34.4
1905	1,909	72		3	33	3	3	16	7	7	10	32	97	30	11	11	340	17.8
1906	2,021	100	5		40	10	1	7	7	2	10	21	250		19	4	476	27.0
1907	2,185	67	1	2	21	10		8	7	1	10	9	300		24	3	463	21.0
District of Columbia Workhouse.																		
1899	2,264	146			152								600				898	39.6
1900	a 5,369	209		2	240			57		21	19	374	437				1,345	25.0
1901	2,265	101			225					18		205	117				666	29.4
1902	1,073	54			62				16	24		53	56		7		272	25.3
1903	1,475	52			141					15		73	106		5	4	396	26.8
1904	1,267	55			162					19		83	145		8	5	477	37.6
1905	1,587	66			180					11		111	174		9	5	556	35.0
1906	1,856	78			223					2	9	90	161		6	7	576	31.5
1907	2,046	85	12		310	12		10		4	18	67	198		6	10	720	35.0
District of Columbia Almshouse.																		
1899	851	25											22				47	5.5
1900	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)
1901	942	8		1									16				25	2.6
1902	592	5		1									7				13	2.1
1903	661	6		1						5			13				28	4.2
1904	633	10		1						5			18				37	5.8

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TABLE B.—*Cases of venereal diseases, alcoholism, opium habit, and cocaine habit treated at hospitals and dispensaries of Washington, and the relation these diseases bear to the total number treated*—Continued.

Institution and year.	All diseases.	Syphilitic affections.			Gonorrheal affections.								Alcoholism.	Delirium tremens.	Opium habit.	Cocaine habit.	Total vice diseases.	Per cent vice diseases.
		Syphilis.	Condylomata.	Tabes dorsalis.	Gonorrhea, including arthritis.	Salpingitis.	Ophthalmia.	Bubo.	Vulvitis and vaginitis.	Stricture of urethra.	Epididymitis and orchitis.	Chancroids.						
Garfield Hospital.																		
1899	1,103	11	1	2	13	24	.....	11	.....	7	9	2	29	.....	9	.....	118	10.6
1900	1,246	14	1	1	19	26	.....	12	.....	14	12	3	34	.....	3	.....	137	10.9
1901	1,307	19	.....	.....	15	22	1	12	.....	7	13	6	41	.....	12	.....	148	11.3
1902	1,600	24	.....	2	8	30	.....	20	.....	15	12	6	56	.....	10	.....	183	11.4
1903	1,401	26	.....	1	21	32	1	25	.....	9	6	17	69	.....	6	.....	213	15.2
1904	1,182	26	1	2	30	20	.....	10	.....	6	7	14	50	.....	1	.....	167	14.1
1905	1,480	32	.....	1	20	37	.....	18	2	11	20	9	80	.....	2	.....	233	15.7
1906	1,432	32	.....	3	16	36	.....	5	2	20	19	4	59	1	4	.....	201	14
1907	1,408	23	2	1	28	32	.....	12	3	12	11	8	48	.....	3	.....	188	13.3
Garfield Hospital—Dispensary.																		
1899	512	25	1	.....	30	2	.....	10	5	6	4	6	.....	.....	.....	.....	89	17.3
1900	642	72	.....	.....	40	2	.....	9	1	6	1	6	.....	.....	.....	.....	137	21.3
1901	755	51	.....	.....	35	6	.....	17	3	3	.....	13	.....	.....	.....	.....	128	16.9
1902	1,033	63	2	.....	37	4	.....	11	2	.....	5	6	2	.....	.....	.....	132	12.7
1903	903	72	2	.....	41	6	.....	14	1	7	8	11	2	.....	.....	.....	164	18
1904	831	44	1	.....	33	12	.....	10	4	1	4	10	4	.....	.....	.....	128	15.4
1905	806	36	.....	.....	34	3	.....	12	3	2	7	9	1	.....	.....	.....	107	13.2
1906	816	33	1	.....	37	18	.....	15	2	1	2	9	.....	.....	.....	.....	118	14.4
1907	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Providence Hospital.																		
1906–07	2,773	17	1	1	11	20	.....	.....	6	6	12	2	428	10	4	.....	518	18.6
1907–08	2,575	20	.....	2	9	34	.....	17	2	6	7	1	382	4	4	.....	488	18.9
Columbia Hospital.																		
1906	1,261	.....	1	.....	.....	68	28	.....	4	.....	.....	.....	.....	.....	.....	.....	101	7.2
1907	1,300	.....	1	.....	.....	95	16	.....	3	.....	.....	.....	.....	.....	.....	.....	115	8.8

Columbia Hospital—Dispensary.																		
1906	1,718	46	4	.....	44	135	1	8	18	.....	.....	9	3	.....	.....	.....	268	15.6
1907	1,697	45	7	.....	30	164	1	10	13	.....	.....	17	.....	.....	.....	.....	287	16.9
Children's Hospital.																		
1905	638	8	.....	.....	3	.....	2	7	3	.....	.....	.....	1	.....	.....	.....	24	3.7
1906	743	7	.....	.....	.....	.....	0	2	4	.....	.....	.....	.....	.....	.....	.....	19	2.6
Children's Hospital—Dispensary.																		
1905	2,899	22	.....	.....	13	.....	2	9	19	.....	.....	.....	.....	.....	.....	.....	75	2.5
1906	4,457	88	1	.....	11	.....	2	7	38	.....	.....	.....	.....	.....	.....	.....	147	3.2
Total	74,611	9,510	233	126	8,092	1,741	196	2,049	453	708	1,226	3,643	9,510	409	256	61	38,183	13.03
Per cent of each	.....	3.46	0.08	0.04	2.89	0.63	0.07	0.74	0.16	0.25	0.44	1.32	3.46	0.14	0.09	0.02	.....	.....

a No report.

SYPHILIS.

This disease first attracted attention in Europe in the latter decade of the fifteenth century. During the siege of Naples by the French troops under the command of Charles VIII in 1495, a disease characterized by ulcers on the genitals, general eruptions of the skin, violent pains in the head and limbs broke out among the French soldiers and the civil population, and after the return of the French soldiers the disease appears to have spread rapidly throughout France and Europe. Quite early in the history it was recognized that the disease was principally contracted during sexual intercourse and hence was named lues venerea, while the populace commonly spoke of it as the Frenchman's disease. The real nature of syphilis remained a mystery until two years ago, when an organism was isolated called the "spirocheta pallida," which is believed to be the causative factor. This micro-organism evidently clings to the secretions of syphilitic ulcers, to the tissues of diseased organs, and possibly also invades the blood and the mammary glands after it has ceased to be a purely local affection. The virus may be conveyed in an extragenital way by kisses, use of infected pipes, cigars, and cigarettes; by glass blowers and the mouthpieces of wind instruments; by dental and surgical instruments; by the act of suckling, from infants to nurse and conversely; in tattooing, and during digital examination by physicians, in case of abraded surfaces, hangnails, etc. There is every reason for assuming that the virus may be transmitted to the offspring, either through the sperma or the blood of a syphilitic mother.

Syphilis is indeed a disease of the blood and affects every tissue of the body. Apart from the long duration of the disease, and the pecuniary losses involved by care and treatment and arrest of the earning capacity, its effect upon longevity and procreation are most destructive.

Syphilis is responsible for 42 per cent of abortions and miscarriages, from 60 to 86 per cent of the offsprings of syphilitics die before or shortly after birth, and those who survive are subjects of degenerative and organic defects, transmitted to future generations. Fournier's personal statistics show that 90 women infected by their husbands became pregnant in the first year of married life; 50 of these aborted, 40 carried the offspring to full term, but of these only 2 survived. He also gives statistics, based upon authentic sources, where syphilis has practically extinguished the posterity of certain families. One table gives out of 216 births 183 deaths; another out of 157 births 157 deaths, or a mortality of 100 per cent.

The disease swells the number of inmates of almshouses, asylums for the insane, and homes for incurables, wrecks the health and happiness of many families, and leads to premature decay. Morrow states that "every case of hemiplegia occurring in a man less than 40 years of age, not addicted to alcohol or affected with lesions of the circulatory system, is eight—or, more correctly, nine—times out of ten of syphilitic origin.

"The proportion of ocular paralysis resulting from syphilis is about 75 per cent on the average. * * * In statistics embracing 743 cases of cerebral syphilis, 354 of which were followed up to a known termination, 77 were cured, 68 died, while the remaining 209 sur-

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vived, but with various infirmities of a grave character and in every case irremediable."

According to the statistics of Erb, Althaus, Fournier, and others, from 80 to 90 per cent of the cases of locomotor ataxia are of syphilitic origin. In 3,429 cases of tertiary syphilis Fournier found diseases of the nervous system in 1,085 instances, cerebral syphilis in 461, spinal affections in 40, general paralysis in 32 cases.

GONORRHEA.

This disease, so often regarded as a trivial affection by frivolous young men, is also specific in character, caused by a micro-organism discovered by Neisser in 1879. The organism clings to the discharges in acute and chronic cases and may persist long after the disease is apparently arrested. While at first a purely local affection, it may produce destructive inflammation, resulting in stricture of the urethra; it may also extend to the testicle, prostate gland, bladder, and kidneys, and ultimately affect the heart, joints, and other vital organs. Indeed, the disease is believed to be responsible for more misery, ill health, and race suicide than any other sociological factor.

The average duration of acute cases is from four to six weeks, but there are a large number of chronic cases requiring at least six months' careful treatment, and, according to the investigations of a committee of the American Medical Association, 3 per cent of the cases are practically incurable. One of the most baneful effects is the latency of the disease and the great danger of communicating the virus to wives by husbands who considered themselves as having been cured before marriage. It is certainly startling to be told by competent specialists that fully 80 per cent of all the operations for inflammatory diseases peculiar to women, practically all the pus tubes, 75 per cent of the suppurative inflammations of the pelvic organs, 70 per cent of all the work done by specialists for diseases peculiar to women are of gonorrheal origin. It is equally appalling to realize that the same germs are the cause of blenorrhea neonaturum, a purulent affection of the eyes of new-born children, which contributes a contingent to our asylums for the blind of from 10 to 20 per cent—from 40 to 60 per cent before the Crede method of prevention was instituted. Dr. Swan M. Burnett, professor of ophthalmology, Georgetown University, expressed the conviction that at least 15,000 of the 50,000 blind persons in the United States lost their sight from this cause, involving a financial loss to the commonwealth of seven and one-half millions annually.

The destructive effects of gonorrhea on the procreative functions have been very properly emphasized in connection with the "race-suicide problem." Neisser maintains that gonorrhea is even a more potent factor than syphilis in sterility, and that more than 45 per cent of all involuntary childless marriages are due to this cause.

The remedial measures which have been proposed for the prevention of these diseases and which affect not only the offender, but the wives, the offspring and not infrequently also perfectly innocent persons are numerous enough, but not so easy of application. Since the chief source of infection is prostitution, the sanitarian suggests that a person afflicted with a venereal disease is quite as much a

menace to public health as would be a case of smallpox or any other communicable disease and points with emphasis to what has been accomplished in Europe in the way of official control of prostitution, as a lesser evil, by registration of brothels and their inmates, periodical inspections, and the detection and cure of diseased men and women. He will tell us, and the statistics will support him, that the prevalence of venereal diseases is least where sanitary measures are most vigorously enforced.

The medical profession is by no means agreed as to the propriety of this method, mainly because such a system seems too much like a recognition of the inevitableness of the social evil and practically an official sanction of it. Others, moreover, with good reason assert that licensing and sanitary inspection tend to produce clandestine prostitution, which has heretofore furnished the largest number of syphilitic cases. On the whole, we may conclude that health officers in this country are not prepared to advocate the European plan of inspection and license.

CRUSADE AGAINST THE SOCIAL EVIL.[a]

The subject of prostitution has always been considered of great sociological and economic importance by persons who have witnessed the sad effects among the inmates of hospitals, prisons, almshouses, asylums for the blind, etc. It is gratifying to note that in 1858, just fifty years ago, a most intelligent and painstaking study was made by Dr. Wm. W. Sanger, resident physician of Blackwells Island, under the auspices of the governors of the almshouse of the city and county of New York. A few passages from the introduction are reproduced, for they are as applicable now as when first indited by his graceful pen:

> Hitherto reticence has been the policy. This position has been held too long, for it is false in principle and injurious in tendency. The day has arrived when the shroud must be removed, when the public safety imperiously demands an investigation into the matter; when those who regard it as a small wrong may have their attention directed to its real proportions. * * * A small matter it decidedly is not. * * * Nor is it unmanageable except when concealed. Stripped of the veil of secrecy which has enveloped it, there appears vice arising from an inextinguishable natural impulse on the part of one sex, fostered by confiding weakness in the other; from social disabilities on one side and social oppression on the other; from the wiles of the deceiver working upon unsuspecting credulity, and, finally, from the stern necessity to live.

The book covers 676 pages, and is the first effort on the Western Continent in sexual and moral prophylaxis, but unfortunately has so far been fruitless on account of the general apathy on the part of the general public.

Some of the facts brought out in the detailed investigation of 2,000 prostitutes in New York City are of sufficient interest to be adduced. Of the entire number 750 were between 15 and 20 years, 1,154 between 21 and 39, and 96 over 40 years of age; 1,238 were foreign born and 762 natives of the United States. Of the latter the majority hailed from New York, New Jersey, Connecticut, Massachusetts, Maine, New Hampshire, and Vermont. Doctor Sanger is inclined

[a] I am indebted to my friend Dr. Edward L. Morgan for a number of valuable references to the literature of the subject.

to attribute this to the employment of a much larger proportion of females in manufacturing and sedentary occupations, and says:

A young woman of ardent temperament can not but feel the hardship of this position in life; * * * thus, when already predisposed in favor of any change, she falls into the hands of the tempter a pliant victim. * * * Beyond the hardships attendant on her daily labor the associations which are formed in factories or workshops, where both sexes are employed, very frequently result disastrously for the female. * * *

In speaking of the foreign class the author says:

Many of the females become mothers almost as soon as they land on these shores; in fact, the probability of such an event sometimes hastens their departure. They exist here in the most squalid misery in some tenement house or hovel. Their children receive none of the advantages of education, for as soon as they can beg they are compelled to aid in the struggle for bread and the most frequent result is that the boys are arrested for some petty theft and the girls become prostitutes, thus contributing to meet the demand caused by the classes already mentioned.

In this connection attention is called to Judge De Lacy's letter, page 380.

Of the 2,000 persons investigated 490 were married, 71 of whom still lived with their husbands; 103 left their husbands on account of ill usage, 60 were deserted by their husbands, 43 were deserted by husbands to live with other women; others left their homes on account of nonsupport, drunkenness, infidelity, and in 75 no specific cause was assigned. There were also 294 widows in the general list. The author believes the principal conclusion to be drawn from the table which he presents "is that the majority of this class (widows) are driven to a course of vice from the destitution ensuing on her husband's death. It has been shown that a large number of them are very young and it can be scarcely necessary to repeat that any young woman in a state of poverty will be surrounded with temptations she can with difficulty resist. Much as this state of society may be deplored, its existence can not be denied."

The section dealing with the hidden springs of the evil is of extreme interest. The causes assigned by the women themselves are as follows:

Inclination, 513; destitution, 525; seduced and abandoned, 258; drink and a desire to drink, 181; ill treatment of parents, relations, or husbands, 161; an easy life, 124; bad company, 84; persuaded by prostitutes, 71; too idle to work, 29; violated, 27; seduced on board of emigrant ships or in emigrant boarding houses, 24.

Doctor Sanger, in discussing the subject of inclination, adduces considerable evidence to show "that if a positive inclination to vice was the proximate cause of the fall, it was but the result of other and controlling influences." Most pathetic instances of how destitution, seduction, and other predisposing causes led to the degradation will be found on pages 489–522.

Of the 2,000 cases examined with reference to previous occupation, 933 belonged to the servant class, 499 lived with parents or friends, 285 were dressmakers, tailoresses, and seamstresses, and the remainder were engaged in miscellaneous occupations; 534 claim to have earned only $1 per week; 336, $2 a week; 230, $3; 127, $4; 68, $5; 27, $6; 8, $7; 5, $8; two had earned over $20 a week, and in 663 the question of earnings was not ascertained.

The investigation revealed the fact that 947 of the 2,000 women became mothers. Of these, 357 single women had 490 children, 357 married women had 791 children, and 233 widows had 636 children. Of the 1,917 children born, 1,185 had died before the inquiry, and 732 were alive. The ratio of mortality was as follows:

Children of—	Per cent.
Single women	73
Married women	58
Widows	50

An average of 62 per cent, or more than six deaths for every 10 children born. On page 487 of the book it is shown that 821 of the 2,000 investigated had contracted specific diseases incident to prostitution, viz: Gonorrhea in 250 instances, gonorrhea and syphilis in 36, and syphilis in 535 cases. The difficulty of securing such information is very great and the probability is that the real number far exceeds this average, but the confessed facts are quite sufficient to estimate the amount of public mischief resulting daily from a mass of prostitutes.

The appendix to the edition of Doctor Sanger's book, published in 1906, states that Doctor Sanger in 1858 placed the number of public prostitutes in New York at 6,000, or one in every 117 inhabitants, while a conservative estimate would now place their number at 30,000, or one in about 55 of the resident population.

In 1902 the committee of fifteen, composed of prominent citizens, presented a report on the social evil with special reference to conditions existing in the city of New York, but found it impossible to approximate the number of prostitutes or houses of prostitution; evidence was secured, however, of over 300 separate disorderly apartments in tenement houses. In many of these tenement houses as many as 50 children resided. An acquaintance by the children with adult vices was inevitable. Almost any child on the East Side in New York will tell you what a "nafke bias" is. * * * The statistics of venereal diseases among children and the many revolting stories from the red-light district tell how completely they learned the lessons taught them.

Mr. George Kibbe Turner, in a recent magazine article, presents a study of the great immoralities in the city of Chicago, and estimates "the gross revenues from prostitution in Chicago in 1906 at $20,000,000, and probably more. There are at least 10,000 professional prostitutes. Annual average receipts of $2,000 each are brought in by these women. They do not themselves, however, have the benefit of this revenue. Much of it is never received by them. They are, in fact, exploited by large business interests. There are four large interests which are concerned in the exploitation of prostitution. The first of these is the criminal hotels, the second is the houses of ill-fame; the third, the cheap dance halls and saloons, and the fourth, the men—largely Russian Jews—who deal in women for the trade." * * * Major Sylvester, the chief of police of Washington, estimates that there are about 400 prostitutes in this city, confined almost wholly to a certain district, and that special pains have been taken by the police to prevent minors from frequenting these places.

A recent investigation by the Department of Commerce and Labor shows that there are 62 houses of prostitution, with 365 white inmates,

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of whom 68 were of foreign birth, and 16 houses with 105 colored females, all natives of this country. It is gratifying to know, from an official source, that the number of prostitutes in Washington is placed at 470.

In the crusade against the social evil every effort heretofore made, spasmodically to be sure, has been to apprehend the female offender, and all such attempts have simply resulted in secret prostitution, which is far more dangerous in its social and sanitary aspects. Indeed every attempt to make laws upon the subject which apply to women and not to men is most unjust and establishes a different standard of morality for the two sexes.

As expressed by Morrow, "the prostitute is but the purveyor of the infection. She simply returns to her male partner, the prostituant, as he is termed, the infection she has received from another prostituant. In the ultimate analysis it will be found * * * that the most essential cause, the *causa causans*, of prostitution is masculine unchastity—the polygamous proclivities and practice of the male, which lead him to seek the gratification of his sexual instinct wherever and whenever he can find a receptive partner. * * * The woman owes her fall to the aggressive solicitations or seductions of the man. She may even be a *quasi* willing victim, but she yields rather from sentimental feeling than from sexual inclination. * * * Women are the most pitiless and unrelenting in the ostracism of those of their sex who have crossed the Rubicon of virtue. The virtuous matron who would shield her daughter from all contact with a fallen sister as contaminating, with most indulgent charity smiles upon the very man who may have been the author of her ruin; she may, indeed, receive him as a suitor for her daughter if he is otherwise eligible. * * * As a result of this double standard of morality, society practically separates its women into two classes—from the one it demands chastity; the other is set apart for the gratification of the sexual caprices of its men. It thus proclaims the doctrine, immoral as it is unhygienic, that debauchery is a necessity for its men."

EDUCATIONAL METHODS.

On the whole, the present writer believes the remedy lies in public education. The great majority of the people have no knowledge of the subject, simply because of the erroneous assumption that it is not one which lends itself to general discussion.

It is indeed gratifying that such a respectable magazine as the Ladies Home Journal has given attention to topics of this character and insisted for several years upon a greater parental frankness with children about their physical selves. In the editor's personal page, in the issue of September, 1908, we find the following courageous statement:

> Because of the secrecy with which the whole question is enshrouded it is practically impossible to obtain absolute figures. But so far as the highest authorities have been able, through the most careful inquiries, to secure accurate figures, it is a conservative statement to make that at least 60 out of every 100 young men are to-day "sowing their wild oats." Of these 60 young men a startling number are either already making or will make a tragedy of marriage. They produce either childless homes, dead-born or blind babies: children with lifelong diseases with them, or they will send thousands of

women to the operating table. * * * This frightful condition has been brought about largely by two contributing factors: (1) The parental policy of mock modesty and silence with their sons and daughters about their physical selves, and (2) the condoning in men what is condemned in women. Fathers and mothers, and in consequence girls, have condoned in a young man this sowing of his "wild oats," because it was considered a physical necessity; that it "would do him good;" that it "would make a man of him;" that "it would show him the world"—all arguments absolutely baseless. The remedies proposed are along the principles already indicated, viz, knowledge of the subject, and that "we fathers of daughters must rid ourselves of the notion that has worked such diabolical havoc of a double moral standard. There can be but one standard—that of moral equality. Instead of being so painfully anxious about the "financial prospects" of a young man, * * * it is time that we put health first and money second. * * * Let a father ask the young man, as the leading question, whether he is physically clean; insist that he shall go to his family physician, and if he gives him a clean bill of health, then his financial prospects can be gone into. But his physical self first. That much every father would do in the case of a horse or a dog that he bought with a view to mating. Yet he does less for his daughter, his own flesh and blood. Once let young men realize that such a question would be asked them by the father of the young women whom they would marry; that a physical standard would be demanded, and that knowledge would be more effective for morality among young men than all the preaching and moralizing and exhortations of the past thousand years. Thus, and thus only, can we save our daughters and their unborn children. But in no other way.

It should be stated in justice to my friend and teacher that the late Dr. J. Harry Thompson, then in charge of the Columbia Hospital for Women in Washington, as early as 1873 advocated the plan of insisting upon a clean bill of health, and related to the class an instance in which the young man, after complying with what he considered a reasonable parental request, told the father:

Now, that I have furnished you with evidence of my own physical cleanness, I shall insist upon a similar evidence in your case, as I am equally anxious to perpetuate the purity of my blood.

To which request the father unhesitatingly acceded.

As a teacher of hygiene I can not find words strong enough in commendation of the brave editorial and the excellent article, "The tragedy of the marriage altar" (by Dr. Abraham L. Wolbarst), in the Ladies Home Journal for September and October, 1908. The writer has realized for years the necessity of proper education, for if we expect the parents to impart information on sexual purity, they must acquire it primarily from some competent and reliable source. Few of our magazine writers have heretofore been brave enough to present this question as the Ladies Home Journal has done. For all these reasons I have advocated for years that hygiene should form part of the curriculum in our public schools and the question discussed from the standpoint of sexual hygiene pure and simple. Public lecturers on the purity of man commit a serious mistake, generally, when they picture the consequences of the social evil without offering a suitable remedy. Many a young man thinks it essential to his health to give vent to his penned up secretions by sexual intercourse and to demonstrate his manhood. If deterred by fear of contracting venereal diseases, in the absence of other remedies he will most likely resort to unnatural methods.

We should make a strong plea in favor of continence, and tell our young men that, while the sexual passion is very strong, it can be accelerated or delayed, excited or lowered, by the influence of the will. We should assure them that sexual indulgence is not a physiological

necessity, and that nature will relieve herself by an occasional nocturnal emission. By the cultivation of pure thoughts, removal of temptation, normal mental conditions, and especially by cold baths and vigorous physical exercise, and avoidance of an excessive meat diet, continence may not only become possible, but easy. Those who witness the good effects of athletic sports can not fail to appreciate that here is a good field in which to expend exuberant animal spirits, and in this sense "public playgrounds" are a strong factor in the promotion of sexual purity. We can hardly go astray if we follow Doctor Parkes in advising a pure young man to make his home after the age of 22 or 23, and thus secure himself both from the temptations and expenses of bachelorhood. Dr. Howard A. Kelly believes that the Christian standard is the solution of the whole problem of chastity. I quite agree with him, provided the church makes an endeavor to combine religious and social work, and until this is accomplished we should not hide the evil because it is not a pleasant subject to talk about.

Suggestions as to what the church may do have been offered in a former report, see page 106, Industrial Hygiene, and the desirability of social settlements in connection with schools and churches will be emphasized in connection with the drink evil, see page 248.

Among the sensible recommendations submitted by the "committee of fifteen" in the city of New York were, first, "strenuous efforts to prevent, in the tenement houses, the overcrowding which is the prolific source of sexual immorality. * * * Secondly, the furnishing, by public or private munificence, of purer and more elevating forms of amusements to supplant the attractions of the low dance halls, theaters, and other similar places of entertainment that only serve to stimulate sensuality and to debase the taste. The pleasures of the people need to be looked after far more earnestly than has been the case hitherto. * * * Thirdly, whatever can be done to improve the material conditions of the wage-earning class, and especially of young wage-earning women, will be directly in line with the purpose which is here kept in view. It is a sad and humiliating admission to make, at the opening of the twentieth century, in one of the greatest centers of civilization in the world, that in numerous instances it is not passion or corrupt inclination, but the force of actual physical want that impels young women along the road to ruin." Referring to the question of intimate contact in tenement houses as a predisposing cause to prostitution, it is a matter of satisfaction to record that both General Sternberg and the writer realized this danger when they urged, in 1898, the adoption of model two-story apartment houses with separate entrances and exits for each family so that the sanctity of the home might be preserved.

STATE METHODS.

The question naturally arises, What can and should the State do to prevent the moral, social, and physical ravages of these diseases? It must be confessed that the measures looking to the inspection and control of prostitutes are sadly inadequate. It has been suggested by German authors that the evil might be materially lessened by holding the persons who knowingly spread venereal diseases responsible for the damages. Indeed, a German jurist goes so far as to advocate the punishment of persons who neglect to seek treatment when afflicted

with sexual diseases. Apart from this the State should certainly insist upon—

First. The enforcement of laws or police regulations relating to houses of ill-fame and to the sale of alcohol, particularly to minors. A closer supervision of soliciting in streets and enticing females under a fixed age. There is certainly no good reason why the terrible temptations which greet our young men and women on every street and in many public places should not be removed. A well-trained police force will have no difficulty in recognizing and banishing the solicitors, both male and female, from the streets, and in cautioning young men, especially minors, of the dangers in the red light districts.

Second. Health boards can also recommend the enactment of laws for the prevention of syphilis, acquired in an extra genital way, by regulating the profession of barbers, chiropodists, and manicurists, and requiring a special examination of wet nurses, cigar makers, and glass blowers. Apart from the real dangers from these sources, the educational effects of such ordinances will be beneficial.

Third. Health boards should also exert their influence toward securing adequate facilities for the treatment of indigent patients.

In northern Europe, where venereal diseases are reportable and treatment is within the reach of all classes, these diseases, according to Weiss, have greatly diminished, but here, as Bulkley puts it, "ignored through ignorance, neglected through negligence of our duty, so ostracised and outclassed venereal diseases, through false shame, concealment, prejudice, carry on their slaughter unhampered, unchecked, and undisturbed, devastating coming generations and ruining the present one."

Fourth. Health boards may cooperate with the profession and dispensaries by printing, for distribution, leaflets stating the nature of the diseases, the manner in which they are contracted, and the ways in which they can be transmitted to other persons, and by the encouragement of a general educational campaign in which sexual purity, respect for women, and the possibility of physiological continence should be inculcated. The evil and far-reaching consequences of impure and unlawful gratification should be clearly pointed out.

In conclusion, a word of caution is necessary to impress upon the victims of sexual diseases the utter uselessness of securing treatment with various advertised cures. As very properly said by Mr. Samuel Adams Hopkins in Collier's Weekly, September 22, 1906:

> All this class of practitioners are frauds and swindlers. Many of them are ex-criminals in other fields. "The old doctors," the "physicians' institutes," the "medical councils," and the "quick cures" are all equally to be shunned. Blackmail is the underlying principle of this business. These treatments can not cure; ten to one they only aggravate the disease and render it dangerous or even deadly. But once they have a man in their clutches they need not help him in order to get his money. If he demurs at their charges, a threat to expose the nature of his ailment to his family or employers is enough. * * * Every advertisement of private diseases or "men's specialists" ought to be a danger signal pointing not only to wasted money, shame, and misery, but often to invalidism and a dreadful form of death, where in 90 per cent of cases reputable treatment would have brought the patient through.
>
> In some localities it is against the law to publish advertisements of this class. Pennsylvania has such a law, but it is a dead letter. St. Louis is attempting to enforce its illegal advertising ordinance, and the St. Louis newspapers are fighting to save themselves the dollars tainted with unspeakable filth.

HARVARD COLLEGE LIBRARY

CHAPTER VIII.

THE TOBACCO HABIT.

In view of the fact that our sociological study of 1,217 families in this city shows an average annual expenditure of $12.19 for each family, which at a conservative estimate would amount to $239,655,000 for the annual tobacco bill in the United States, it is important to consider the effects of tobacco on the system.

Tobacco owes its general effects to the presence of toxic alkaloids known as nicotine, nicotianin, and the "pyridin bases" which are formed during smoking. Syrian and Havana tobacco contain little or no nicotine, while the common grades contain from 3 to 4 per cent. Nicotine is a poison which produces a local irritation of the digestive tract, nausea, and diarrhea. In some instances there may be dizziness, weakness, restlessness, depressed action of the heart, and convulsions. Strangely enough, man becomes accustomed to these effects and may even experience an agreeable excitation of the nervous system, characterized by increased mental and physical elasticity. There is nothing to justify the assumption, however, that the use of tobacco is free from danger. Professor Seaver's observations on Yale students appear to show that nonsmokers made the best physical gains in weight, chest measure, and lung capacity, and that out of every 100 of the best students only 5 were smokers, while 95 were not smokers. His data were apparently so convincing that Japan, ever ready to profit by the experience of other nations, enacted in 1900 a law prohibiting the smoking of tobacco by persons under the age of twenty—an example well worthy of emulation. Dr. A. A. Woodhull, U. S. Army, holds that cigarette smoking by the young is harmful, as it arrests the natural elimination of waste and hinders the utilization of fresh material. This explains the fact that the stature of youths who use it is less than those who do not use it.

The bad effects of tobacco may be summarized as follows: Tobacco smoke contaminates the air of rooms with coal gas and other products of combustion. According to the London Lancet,* 1 ounce of tobacco yields from 1 to 5 pints of carbon monoxide or coal gas, which, when inhaled, is a blood poison. In many instances tobacco in any form produces a chronic inflammation of the throat and stomach, which disappears after the removal of the cause. The excessive use of tobacco produces a chronic form of nicotine poisoning, with impairment of vision, nervous irritability or exhaustion, a predisposition to neuralgia, and a peculiar affection of the heart, described by Professor Da Costa as the tobacco heart, characterized by irregularity of the heart sounds, accelerated action and weakness of the cardiac muscles. Chewing of tobacco is even more to be deprecated than smoking, as the injurious elements are dissolved by the saliva and not infrequently swallowed. Doctor Woodhull points out that cigarette smoking by the young develops a greater tendency to acquire an appetite for alcoholic liquors, premature puberty is induced, increasing the sexual propensity and leading to improper sexual practices. There is a consensus of opinion among educators that the use

* The Lancet, London, 1908, CLXV.

of tobacco dulls the memory and intellect. When a promising pupil in a public school begins to decline in his work it is almost certainly found that he has begun the use of cigarettes.

On the whole we may conclude that the use of tobacco is not a physiological necessity, and its abuse, like that of other nerve stimulants, is doubtless a fruitful cause of a breakdown. It is especially harmful in nervous subjects and those of insufficient will power properly to restrict its use. A German authority maintains, and no doubt correctly, that the danger is greater from smoking cigarettes, because of the ease with which the smoke is inhaled. In any event, the practice of inhaling the smoke into the lungs, or smoking before breakfast, is a bad one. Pipes, cigar or cigarette holders, and the mouth should be kept clean. Symptoms of shortness of breath, obscure pains around the heart and nervous irritability are indications to reduce or stop the habit altogether.

CHAPTER IX.

THE ALCOHOL QUESTION.

In our sociological survey of 1,217 families in this city we found the average expenditure for alcoholic beverages to be $16.14 per annum. In view of the importance of the subject from an economic, social, and sanitary point of view, a study of the alcohol question seems very desirable. Before doing so it will be well to refer briefly to different alcoholic beverages in most common use.

FERMENTED LIQUORS (WINE).

Among the oldest and best known of alcoholic beverages is wine, which is obtained from the fermented juice of grapes. The juice contains water, proteids, grape sugar, levulose, inosite, pectins, tartaric and malic acids and their salts; also small quantities of mineral salts (sulphates and chlorides), coloring matter, and tannic acid. In off years malic acid predominates and there is a deficiency of sugar. The quality of the juice and the resulting wines depend upon the character of the grape (soil, climate, ripening process) and many other factors in the preparation of the must.

If a white wine is desired the skins and stems of the grape are removed, while for colored wines they are permitted to remain; the blue and yellow pigments during fermentation and under the influence of free acids turn red.

Fermentation of the grape juice is usually carried on at a temperature between 60° and 75° F. and is the result of a natural ferment or yeast plant found on the skin of the grape. During fermentation the proteids in the must are to a great extent used up in the formation of yeast cells and the grape sugar and part of the levulose are split up into alcohol and carbonic acid. The inosite remains unchanged, the pectous matter is changed, and a portion of the salts are percipitated in the form of cream of tartar. In addition, glycerin and various aromatic ethers, which impart to the wine its flavor, and small quantities of the higher alcohols and free organic acids are formed. The resulting wine may be said to contain, apart from

water, alcohol and carbonic acid, also small quantities of proteids, inosite, free malic, tartaric and succinic acid, salts, glycerin, and aromatic ethers, and in the case of grapes fermented with their skins also tannic acid and coloring matter.

The lighter wines of this and other countries, viz, the Bordeaux, Burgundies, Rhine, and Moselle wines, hock, sauternes, clarets, and champagnes usually contain from 9 to 15 per cent of alcohol by volume. The fortified or stronger wines like port, sherry, tokay, etc., contain from 16 to 27 per cent of alcohol. The amount of sugar varies from 0 in dry wines to 26 per cent in the sweet wines. The natural wines contain little or no carbonic acid as most of it escapes during fermentation. The effervescent wines like champagne are the product of a second fermentation in the bottle, sugar and flavoring extracts having been added for the purpose.

The dietetic effects of wine depend entirely upon the amount of alcohol present. Dry wines usually promote peristaltic action and act upon the kidneys, the red wines commonly retard the movements of the bowels which is due to the astringent effects of tannin.

Cheap wines are frequently made from other fruits and even the natural wines have been subject to various forms of adulteration, such as the addition of sugar, glycerin, various ethers, logwood and other coloring agents, like malvey leaves, red beets, carmine, fuchsin, and other analin colors.

Unfortunately the manufacture of artificial wines appears to be everywhere extending. Some years ago Petiot considered it perfectly legitimate to extract repeatedly the skin and seeds of grapes with a solution of sugar, which was then permitted to undergo the usual fermentation, the percentage of alcohol varying with the amount of sugar present. Harrington informs us that an artificial wine known as "piquette," and of which over 50,000,000 gallons were made in France in 1898, is made as follows: "To each gallon of water used are added 1 pound of raisins and 1 of dried apples; the mixture is placed in an open vessel and allowed to stand three days. It is then bottled with one-half teaspoonful of sugar and a small piece of cinnamon in each bottle. It is said to be 'a pleasant and harmless beverage.'" Indeed, so serious and widespread has become the manufacture of artificial wine in France that the wine growers in 1907 revolted and demanded adequate legislative protection. Harrington and Wiley furnish other examples of the methods followed by those engaged in this nefarious trade:

Port.—Cider, 30 gallons; alcohol, 5 gallons; sirup, 4 gallons; kino, one-half pound; tartaric acid, one-quarter pound; port-wine flavor, 6 ounces.

White wine.—Dissolve 25 pounds of grape sugar and 1 of tartaric acid in 25 quarts of hot water; add 75 quarts of cold water and 50 pounds of grape pulp, stir, cover, let ferment for four or five days and strain.

Claret.—California hock, 40 gallons; extract of kino, 8 ounces; essence of malvey flower, 8 ounces.

These samples are given to show how easy it is to deceive the average customer, who often pays a high price for beverages assumed to possess food values or medicinal properties.

FRUIT WINES.

Homemade wines are often made from the fermented juice of apples, pears, currants, gooseberries, and oranges; they contain pretty

much the same ingredients, except inosite, as grape wine. The percentage of alcohol is, however, less, on account of the deficiency of sugar, unless sugar has been added, which is often done.

Apple or pear cider usually contains from 4½ to 6 per cent of alcohol. According to Parkes such wines are sometimes manufactured or stored in earthenware vessels, coated inside with litharge glaze, which readily gives up large quantities of lead to acid liquids and is thus productive of lead poisoning. If the air is not absolutely excluded from all kinds of wine, acetous fermentation ensues, and the liquid is transformed into vinegar. The effects of home-made wines are moderately stimulating, and slightly laxative and diuretic on account of the free organic acids contained therein. It is also held that their habitual use favors the formation of gravel and stone in the bladder and chronic inflammation of the urinary passages.

BEERS.

Beer is a very ancient beverage, having been used by the Egyptians over two thousand years ago. It was introduced into Germany during the twelfth century and for a long time the art of brewing was largely confined to the cloistered monks. Pure beer is manufactured from malt, hops, and water. In the first place, clean barley is steeped in hard water and is then allowed to sprout in heaps, which are spread out when the germination has reached the requisite stage. During this process diastase develops which converts the starch into dextrin and maltose, and the insoluble albuminous matter is rendered soluble. Further germination is prevented by first drying and then parching the malt at a temperature of 125° to 180°; this also develops color and flavor. The malt is then screened for the removal of the sprouts and, after being crushed, is steeped in water at a temperature of 160° F., which has the effect of converting the balance of starch in the wort into maltose. The resulting infusion, after the addition of hops, is now boiled for a couple of hours, during which about one-third of the bitter principles of the hops are taken up, the coagulable proteids are separated and all existing micro-organisms are destroyed. The decoction is then rapidly cooled in tanks and transferred into vats, where, after the addition of yeast, it is allowed to ferment at a temperature of 60° to 66° F.; during this process the maltose is split up into alcohol and carbonic acid. When fermentation has gone far enough the yeast is removed and the beer is run into casks. Good beer, apart from alcohol, carbonic acid, glycerin, succinic acid, also contains some proteids, sugar, malt extracts, salts, and bitter principles. The percentage of alcohol varies from 3 per cent in the lighter kinds to 6 or 7 per cent in ale and porter. In the 28 specimens examined by Mr. C. A. Crampton, of the Internal Revenue Office, the amount of alcohol averaged 4.63 per cent by weight or 5.79 per cent by volume.

The so-called "Weiss beer" is made from a mixture of barley and wheat malt and usually contains more carbonic acid and yeast particles and less alcohol than ordinary beer. Porter, ale, and bock beer are made from a stronger wort and hence contain more alcohol. The chemical analysis shows that beer is not only a beverage, but also a foodstuff, because 2 liters of beer contain about 10 grams of proteids

and 100 grams of carbohydrates, or nearly one-tenth of the protein ration, and one-fifth of the daily requirements of carbohydrates.

In recent years beer has been known to be adulterated by the employment of glucose and invert sugars obtained by the action of dilute sulphuric acid upon rice and corn.

This sophistication affects not only the nutritive value of the beer by a deficiency of the proteids, but may also be a source of arsenical poisoning, if the sulphuric acid happens to be derived from arsenical pyrites. Such an instance occurred in 1900 at Manchester and Salford in the northwest of England, where over 8,000 consumers of beer developed symptoms of arsenical poisoning, such as paralysis and wasting of certain muscles, functional disturbances of certain sensory nerves, with 36 fatal cases from peripheral neuritis. Specimens of the glucose showed from 0.02 to 0.05 per cent of arsenious oxide and the beers made from it contained from 0.10 to 1.50 grains of arsenic per gallon. It is gratifying to note that adulterated beer is quite uncommon in this country, as none of the 476 samples examined in the State of New York contained hop substitutes. The effects of beer and wine depend upon their purity, the quantity consumed, and the susceptibility of the individual. Quite a number of authors believe that these beverages, consumed in moderation, say from one-quarter to one-half liter of wine or from one-half to 1 liter of beer during twenty-four hours, in otherwise normal persons, will have no injurious effects, and may even possess certain advantages, such as aiding digestion by promoting the flow of digestive juices, while the bitter principles of hops possess certain tonic properties. On the other hand Buchner, Ogata, and others claim that beer retards digestion, and all agree that if taken habitually in excess, both beer and wine, in the language of Parkes, "lead to the storage up of superfluous fat in the tissues, and they interfere with the proper elimination of effete matter; imperfect oxidation leads to an excessive formation of uric acid, and the plethoric and gouty habit are produced, eventually tending to palpable disease."

BRANDY.

Brandy, the strongest alcoholic drink, is derived from the distillation of wine, but as commonly sold it is for the most part a mixture "of varying amounts of spirits from the distillation of corn grain spirits, etc." Apart from water it contains 55 to 65 per cent of alcohol by volume, or 39 to 47 per cent by weight, in which are held aromatic ethers, also traces of tannin, coloring matter, and various secondary products, including aldehydes, furfural and higher alcohols. Harrington gives a number of examples showing how fictitious brandy is made, of which the following is reproduced:

Boil 5 ounces of raisins and 6 of St. John's bread in water, filter and make up to 10 quarts; mix this with 20 quarts of alcohol, one-half ounce of essence of violet flowers, and 10 ounces of brandy essence.

RUM AND ARRACK.

Rum is distilled from fermented molasses, and arrack from fermented rice or cocoanuts; they contain from 55 to 65 per cent of alcohol by volume and more or less of the objectionable fusel oil and, like other strong drink, are frequently adulterated.

WHISKY.

Whisky is made by distillation of malted grain, especially rye, corn, and wheat, although barley, oats, and potatoes are sometimes used. The mash for Scotch whisky consists of 2 parts of malt, 7 of barley, and 1 each of oats and rye; the mash for Irish whisky is the same with the exception of the rye; the peculiar smoky taste of these whiskies is due to the cresote products evolved in peat and turf fires over which the malt is dried. Good Bourbon whisky has an agreeable flavor, the mash being a mixture of corn and rye. All new whiskies, in addition to about 45 per cent of ethylic alcohol, contain amylic alcohol or fusel oil and other impure alcohols. These impurities are very irritating to the mucous membranes of the throat and stomach and produce rapid intoxication; the fusel oil is also responsible for the headache, nausea, and general depression so often observed after the consumption of impure liquors. The amount of toxicity of the fusel oil depends upon the character of the raw material, it being greatest when derived from potatoes and least when obtained from grapes. The aldehydes can be removed by redistillation and the fusel oil by charcoal or a fractionating patent still. The fine spirit secured by rectification contains from 72 to 90 per cent of absolute alcohol and only traces of the impurities referred to, while ordinary whisky contains from 35 to 50 per cent by volume of alcohol and almost always some of the toxic principles. It is a familiar but true saying that whisky improves with age in taste and flavor. This is due to the fact that the constituents of fusel oil are converted into nontoxic aromatic ethers which impart the agreeable flavor to aged whiskies and brandies and also constitute, with other compounds, the bouquet in different wines. The new and cheap grades of whisky are decidedly injurious to health and when fusel oil is present to the extent of 1 part per 1,000 it is unfit for use.

There is abundant evidence to show that whisky is frequently manufactured from alcohol, water, and various flavoring compounds, of which the following example is given by Harrington:

Scotch whisky.—Alcohol, 46 gallons; genuine Scotch, 8 gallons; water, 18 gallons; ale, 1 gallon; cresote, 5 drops in 2 ounces of acetic acid; pelargonic ether, 1 ounce; honey, 8 pounds.

The writer fears that in the manufacture of fictitious whiskies methyl or wood alcohol is also used on account of its cheapness; this, when employed as an intoxicant, has been known to produce total blindness.

THE NATION'S DRINK BILL.[a]

As the nation grows in population and wealth, so does its expenditures for stimulating beverages. This is the more surprising in view of the warfare waged against the saloon and the milder beverages. The per capita consumption of spirituous liquors for the year ending June 30, 1907, is the highest on record, reaching 23.53 gallons per capita, an increase over 1906 of 1.27 gallons.

[a] This article appeared in the American Grocer, May 27, 1908, and is reproduced by permission of the editor.

The advance in the consumption of distilled spirits from 1.52 gallons per capita in 1906 to 1.63 gallons in 1907 is more notable than an increase of 0.12 gallon in the use of wine and a rise of 1.04 gallons in beer.

The year was one of phenomenal prosperity, and this may account for the increase in expenditure for stimulants, which was quite as marked for coffee and cocoa as for alcoholic drinks. The use of tea seems to have declined considerably, as it falls below the yearly average for five years.

A gain of 1,600,806 in population will not account for the increased use of stimulating beverages. Possibly extensive advertising is responsible for no small share of the increase, which seemingly goes forward in spite of all efforts to check the sale of intoxicating beverages and to kill the demand for coffee. "There's a reason," but it baffles solution. There are many theories or opinions, but the finding of a reasonable check to the use of spirituous beverages seems as far away as ever. Legislation does not seem to curb the curse of drink.

RETAIL COST OF ALL BEVERAGES.

The various estimates of cost, presented by the American Grocer, compiled, so far as quantity is concerned, from the report of the United States Bureau of Statistics, shows that the average annual cost of alcoholic and nonalcoholic stimulants in the United States, 1905–1907, was as follows:

Alcoholic drinks		$1,466,584,827
Nonalcoholic stimulants:		
Coffee	$161,598,437	
Tea	41,002,680	
Cocoa	10,000,000	
		213,501,117
Total, 1907		1,008,085,444
1906		1,060,489,520
1905		1,548,708,307
1904		1,498,622,715
1903		1,451,633,379
Total drink bill, five years, 1903–1907		7,857,548,365
Average annual drink bill, 1903–1907		1,571,509,673

The above represents a per capita expenditure for beverages in 1907 of $19.74 for the 85,817,239 inhabitants of the United States, or $98.70 for each family of five. Yearly average for five years, $19, or $95 per family.

The quantities of the four leading beverages consumed annually for three years, 1905–1907, as estimated by the American Grocer, were as follows:

	Gallons.
Beer	1,698,067,659
Coffee	1,615,984,370
Tea	559,500,000
Spirits and wines	156,029,818

PER CAPITA CONSUMPTION ALCOHOLIC DRINKS.

The following table shows the annual per capita consumption of liquors in the United States for ten years:

Year ending June 30—	Spirits.	Wines.	Beer.	Total.
	Gallons.	*Gallons.*	*Gallons.*	*Gallons.*
1898	1.12	0.28	15.96	17.36
1899	1.18	.35	15.28	16.81
1900	1.28	.39	16.01	17.68
1901	1.33	.37	16.20	17.90
1902	1.36	.63	17.49	19.48
1903	1.46	.48	18.04	19.98
1904	1.48	.58	18.28	20.35
1905	1.45	.42	18.50	20.38
1906	1.52	.55	20.19	22.26
1907	1.63	.67	21.23	23.58

TOTAL ALCOHOLIC DRINK BILL.

Bringing together the quantities of liquors consumed, estimated at the retail cost on the basis of previous reports, it is shown that the American people spent for alcoholic stimulants for the year ending June 30, 1907:

Beer	$843,333,829
Whisky (exclusive of quantity used in arts)	118,456,001
Grand total, 1907	1,466,544,827
1906	1,450,855,448
1905	1,325,439,074
1904	1,277,727,190
1903	1,242,943,118
1902	1,172,565,235
1901	1,094,644,155
1900	1,059,563,787
1890	973,589,090

LIQUOR AND TOBACCO TAX.

The total revenue of the United States Government in 1907 from spirituous and malt liquors, and from tobacco, the ally of liquor, was $247,458,911, or $2.88 per capita, equal to $14.40 tax on every family.

CONCLUSION.

We must leave to students of social economy the question of a great nation spending an average of over one and one-half billions annually for stimulating beverages; a sum about as great as the appropriations of the Congress for a session. Nearly double as much per capita is spent for drink as is spent for the maintenance of public schools. It nearly equals the value of exports of merchandise per capita. It is double the amount of the public debt. It is more than the farm value of the corn crop, which exceeds 2,500,000,000 bushels; three times the value of the wheat grown; more than double the worth of the cotton crop. The indirect cost is beyond estimate, and so great is the waste and misery created that States are fighting the evil and endeavoring to banish the saloon as a distributing factor. It is easily the foremost question of the day, and places the support of a big navy or an army in the shade.

ALCOHOL AS A FOODSTUFF.

Professor Liebig was perhaps the first to declare that alcohol stands only second to fat as a respiratory material, but wisely added that the same effect could be produced in the body by means of saccharine and farinaceous articles of food at one-fourth or one-fifth the cost.

Professor Atwater, in order to determine the food value of alcohol, substituted for a portion of the nonnitrogenous food a quantity of ethyl alcohol equivalent in energy to the food which it replaced—2½ ounces of absolute alcohol per day in six doses—and found what had been taught in fact by Liebig (1) extremely little of the alcohol was given off from the body unconsumed in the breath or otherwise—the alcohol was oxidized, i. e., burned as completely as bread, meat, and other ordinary foods in the body and in the same way; (2) in the oxidation all of the potential energy of the alcohol was transformed into heat or muscular energy. In other words, the body transformed the energy of the alcohol just as it did that of sugar, starch, and fat. That is, whether the body was at rest or at work, it held its own just as well when alcohol formed a part of the diet as it did with a diet without alcohol.

These experiments clearly demonstrate the food value of alcohol, but Atwater wisely adds that it should be remembered that the physiological action of alcohol involves much besides its nutritive effect. Its influence on the circulatory and nervous functions is especially important. He also said:

> Whether alcohol is to be called a food or not depends upon the definition of the food.

The writer does not question the scientific deductions made from these experiments, but objects that alcohol should be considered anything else than an accessory, to be used with extreme precautions. Professor Atwater has told us, in one of his excellent bulletins, that "the most healthful food is that which is best fitted to the wants of the user; the cheapest food is that which furnishes the largest amount of nutriment at the least cost, and the best food is that which is both healthful and cheapest."

PHYSIOLOGICAL EFFECTS OF ALCOHOL.

Absolute alcohol, on account of its affinity for water, exerts a caustic effect on the mucous membranes. When properly diluted, it is rapidly absorbed and speedily oxidized. It is a stimulant to the central nervous system and the sympatheticus of the heart and produces a feeling of exhilaration, vivacity of the mind, accelerated pulse, and increased muscular activity. Bunge denies these properties, and claims that its primary action is that of a depressant, and that its apparent good effects are simply due to the obtusing influence upon physical and mental suffering. But this is scarcely a correct assumption, as there are individuals in whom the smallest doses produce palpitation of the heart, throbbing of the carotids, and great mental activity. He also claims that alcohol does not produce renewed vigor in tired individuals, but simply obtuses the feeling of exhaustion. Dr. Henry Smith Williams, discussing the relation of alcohol to muscular work, states that alcohol does not increase the capacity to

do muscular work, but distinctly decreases it. (McClure's Magazine, October, 1908.) Atwater's experiments conclusively show that in the oxidation of alcohol in the system all the potential energy is transformed into heat or muscular energy; and there is certainly reason for believing that it is also a stimulant. How else can we explain the action of brandy in cases of heart failure? It would be absurd to talk here of an obtusing or stupefying effect. It is a stimulant which, like other agents of this class, is followed by a stage of depression.

Alcohol, in moderate and diluted doses, evidently stimulates digestion, as shown by its beneficial effects after a hearty meal; but large quantities interfere with or arrest the peptonizing process, and frequently produce acute gastric catarrh. These effects are liable to be observed, when present, to the extent of 10 per cent of the gastric contents. Alcohol also exerts a marked diuretic effect, which is believed to be due to a direct irritation of the renal epithelium.

PATHOLOGICAL EFFECTS OF ALCOHOL.

The habitual use of immoderate doses of alcohol can not fail to produce serious injury to mind and body. One of the most constant effects is chronic inflammation of the stomach, with consequent impaired digestion and nutrition. It produces fatty degeneration of the heart, liver, and arterial coats, a most common cause of apoplexy, probably because it promotes the conversion of albuminoid tissues into fats. The connective tissues of the body increase in amount and their subsequent contraction gives rise to cirrhosis (hardening of the liver), Bright's disease, and chronic meningitis. It is one of the most fruitful causes of insanity and affections of the nervous system—like inflammation of the nerves, palsies, epilepsy, etc. Doctor Macatee's investigation shows that during the past nine years 9,510 patients were treated for alcoholism and 409 for delirium tremens in the city hospitals of Washington, the majority of the patients at public expense.

It is a lamentable fact that while the mortality from the so-called preventable diseases in the United States has markedly declined in the last two decades, the death rate from Bright's disease, heart disease, dropsy, apoplexy, and pneumonia are apparently greater than in 1890. For reasons just stated we may well pause to inquire whether our ever-increasing "national drink bill" may not be a factor in the undue prevalence of these diseases, as also in the increase of insanity and nervous disorders.

ALCOHOL INCREASES THE SUSCEPTIBILITY TO DISEASE.

Professor Hodge, of Clark University, in 1895 demonstrated the injurious effects of alcohol upon dogs. The more recent experiments of Taavlaitmen, cited by Babcock,[a] apparently show that in dogs, rabbits, guinea pigs, fowls, and pigeons alcohol distinctly increases the susceptibility to experimental infection; and that the abnormal temperature of experimental diseases persists longer than in infected animals that do not receive the drug. Dr. Reid Hunt, of the Public

[a] Preventive Medicine, p. 83.

Health and Marine-Hospital Service, in 1906 conducted a similar line of experiments and arrived at the same conclusion. Metchnikoff[a] attributes this to the fact that alcohol lowers the resistance of the white corpuscles of the blood, which are the natural defenders of the body.

Lancereaux has shown that in 2,192 cases of tuberculosis studied by him over one-half were confirmed drunkards, and Guttstadt's Statistics[b] also indicate that consumption is especially common among bartenders and brewers. Indeed, every physician knows that alcohol not only predisposes to tuberculosis, pneumonia, typhoid fever, and other infectious diseases, but also that these diseases are more fatal or run a more severe course in alcoholic subjects—probably because of the impaired digestive functions and a general depraved nutrition of the system, with consequent diminished power of resistance. Apart from the diseases already referred to, alcohol also increases the tendency to rheumatism and gout, and according to Babcock "there is a distinct relationship between the incidence of alcoholism, insanity, venery, and crime."

EFFECTS OF ALCOHOL UPON LONGEVITY.

The following figures, taken from Doctor Ogle's report (Forty-fifth annual report of the registrar-general of England), show the effect of intemperate habits in shortening life:

Comparative mortality of males 25 to 65 years of age.

All causes complete.	All males, England and Wales.	Brewers.	Innkeepers-publicans spirit, wine, or beer dealers.
Mortality figures	1,000	1,361	1,821
Diseases of the nervous system	119	144	200
Respiratory system	182	226	217
Urinary system	41	55	83
Liver	39	96	240
Alcoholism	10	25	55
Gout	3	9	13

Life-insurance tables based upon English statistics cited by Jewett (Town and City, p. 87):

	Average expectation of life.	Moderate drinkers.	Total abstainers.
At 20 expect to live to be	62	35	64
At 30 expect to live to be	65	43½	66½
At 40 expect to live to be	68	51½	68

EFFECTS OF ALCOHOL UPON MENTAL AND MORAL FACULTIES.

Perhaps one of the most deplorable effects of alcohol is that it produces structural changes of the cells of the brain and spinal cord—a

[a] The New Hygiene, p. 25. [b] Klin. Jahrbuch f. 1904.

fruitful cause of insanity—and leads to a mental and moral deterioration, characterized by the loss of will power, blunted moral sensibilities, and the ruin of character; and, saddest of all, these effects are often transmitted through vulnerable anatomical elements to the offspring.

A curious record has been complied by Professor Pellman of the University of Bonn. It relates to the career of a notorious drunkard who was born in 1740 and died in 1800. In investigating her history her descendants were found to have numbered 834, of whom 709 have been traced from their youth. Of these, 7 were convicted of murder, 76 of other crimes, 142 were professional beggars, 64 lived on charity, and 181 women of the family led disreputable lives. Further inquiry, moreover, showed that the family cost the German Government for maintenance and costs in the courts, almshouses, and prisons no less than $1,250,000—in other words, just a fraction under $1,500 each. It would probably be difficult to find a more remarkable example than this of the evil effects of the drink habit and the transmission of hereditary defects.

The statistics of the Elmira Reformatory for 1900 show that 3,363 of the 9,344 convicts had drunken ancestors and the records of every police court reveal the startling fact that about 60 per cent of all sentences are imposed for drink. Ninety-one of the 175 prisoners examined by Dr. Paul B. Johnson in the Washington Workhouse were sentenced for drunkenness and disorderly conduct, and 171 admitted the use of alcohol, most of them to excess. Mr. Boies estimates that the share of alcohol in the expense of crime in the United States is $4.34 per capita, or over $420,000,000 per annum (Jewett, p. 24–25).

Professor Demme's statistics of 10 temperate and 10 intemperate families, based upon ten years' study and observation, are also of interest:

	Temperance families.	Drunkards' families.
Children	61	87
Died before 6 weeks old	5	25
Idiots	0	6
Stunted in growth	0	5
Epilepsy	0	5
Nervous in childhood, but cured	6	0
Ordinary good health in childhood, per cent	81.5	17.5

Moreover, Von Bunge has shown that the daughters of alcoholic fathers in the third generation are usually unable to nurse their offsprings.

ALCOHOL AS A CAUSE OF ACCIDENTS.

Considerable evidence might be adduced to show the relationship of alcohol to railroad and other accidents. Those who are familiar with the effects of intoxicants need no argument in favor of sobriety. All business men and railroad corporations realize the value of sober habits among their employees, and quite a number insist upon total abstinence at all times, whether on or off duty.

On the whole we may conclude that, for persons in health, alcohol in any form presents no advantages not found in other foodstuffs or stimulants, and which are, moreover, comparatively free from the dangers attending its use. Indeed, the subsequent depressing effects

and the baneful influence of its misuse should make us careful in the employment of alcohol, even for medicinal purposes, especially when rest, proper food, and some of the beverages and stimulants like coffee, tea, or beef tea may accomplish the same object.

CAUSES OF INTEMPERANCE.

The writer has watched with satisfaction the physical development of the population of the United States, which has more than justified the opinion, long since expressed by scientists, that a mixture of the blood of different nations of the same race is better than either of the parent stock. Our typical American is a very different type from his English, French, Irish, or German ancestor. As a result of a commingling of the blood, he has developed into an individual of strikingly superior physical and intellectual qualities, destined to play a very important rôle in the affairs of the world. And yet one of the dangers which appears to threaten us is the growing evil of intemperance, which is intimately connected with our mode of life. In a general way, there is no class of men more ambitious, more industrious, and more fond of accumulating wealth than our people. The very excellence of our progress and its accelerated speed have quickened the pulse, stimulated the nerves and intellect, and fired the ambition of men until they overleap the limits of their natural powers. Under this high-pressure system the rich and poor alike strain their physical and mental energies. Rest and recreation seem impossible to many and the temporary stimulant derived from the tempting cup offers, for the time being, relief to our physical and mental exhaustion. It is, however, a dangerous remedy. It is like the whip applied to the tired horse and the result is generally bad.

Professor Kraeplin, one of the foremost experts on insanity in Europe, in his monograph on "Alcohol and Youth," in discussing the causes which lead up to the drink habit, says:

> The blacksmith offers as an excuse exposure to heat, the liveryman pleads exposure to cold, the masons and bricklayers plead outdoor exposure, the miller blames the dust, the sailor the fog, another his wife, and still others business reverses.

From this he concludes that the very diversity of causes assigned show that none of them will stand the test of scrutiny. Mr. Wurm, in a very interesting address on the alcohol question, delivered at Essen, September 20, 1907, takes issue with Kraeplin and proceeds to present some of the causes which operate in the drink habit among wage-earners. The writer quite agrees with him that the dust-producing occupations are at least predisposing factors, especially when the employer makes no attempt to furnish pure water or non-alcoholic beverages to allay the thirst and when the rules and regulations for the prevention and removal of dust are totally ignored. In like manner he makes a strong plea for the operatives exposed to extremes of high temperature, the inhalation of injurious and offensive gases, and very properly insists that the causes of abnormal thirst should primarily be prevented by efficient and copious ventilation. He attributes, and we believe correctly, the drink habit so prevalent among painters to the fact that they resort most unwisely, upon the appearance of the first symptoms of lead colic, to alcoholic beverages to allay their suffering, when, as a matter of fact, the most

rational preventive measure would be to abolish the use of lead pigments altogether. He describes, graphically, the exposure of quarrymen, stonecutters, masons, bricklayers, joiners, teamsters, motormen, etc., to the elements, and points out that the men engaged in construction work are rarely supplied with a shack and a cook stove where they can warm up and take their noonday meal. In the absence of suitable conveniences the workmen are compelled to frequent the saloons, and here highly seasoned tidbits promote thirst, while the social element is also conducive to excesses. All of these evil conditions are very much aggravated in this country by the pernicious system of treating. This abominable custom can not be too strongly condemned, as it is almost as vicious as the seduction of a young man to take his first drink. Many a young man has fallen a victim to the habit by the encouragement of his older companions to "be a man and take a drink."

Among the causes stated by 171 of the prisoners in the Washington workhouse investigated by Dr. Paul B. Johnson, we find the following: Bad companions, dusty employments, long hours of work, especially at night, exposure to cold and wet, work in hotels and bottling establishments; given toddy, beer, etc., as children 4 years old and upwards; death of relatives and troubles.

Mr. Wurm considers the effects of mental and bodily fatigue as a cause of intemperance and emphasizes the peculiar effects of mental strain combined with monotonous machine work, in which, after all, constant attention is demanded to prevent accidents and spoiled products. Mr. Emmet L. Adams, master of the American Machinists, also believes that the monotony of machine work, especially when combined, as in the naval gun shops, with strict orders not to converse during the work, is conducive to mental fatigue and emptiness, which the wage-earner seeks to counteract by the use of alcoholic beverages. In his opinion long hours, dirty work, and low wages are fruitful causes of discontent and intemperance.

POVERTY AND DRINK.

Referring to the effect of low wages as a cause of intemperance, Mr. Wurm quotes Prof. Justus von Liebig, who, in 1860, declared:

> Alcoholism is not the cause, but the result of distress. It is the exception to the rule for a well-nourished individual to become a drunkard. When, on the other hand, a man's earnings are insufficient to provide the quantity and quality of food required for the restoration of his working capacity, sheer necessity compels him to have recourse to alcohol.

It will be remembered that Liebig was the first to demonstrate the food value of alcohol, and this view may have been justified at a time when wages in Germany were extremely low, and the cost of whisky so nominal as to be classified as one of the most inexpensive articles of food. Wurm also quotes Friedrich Engel, who appears to have been aware of the fact that the social conditions, as observed by him in England in 1845, are not only a cause of alcoholism, but that the drink habit is also very often the primary cause of the low standards of living.

Engel says:

> Seduction and every possible temptation combine to produce the drink habit. Ardent spirits at present constitute the workingman's only source of pleasure. He returns weary and exhausted from his work to a damp, gloomy, and unat-

tractive home, devoid of all the ordinary comforts of life. He is sadly in need of good cheer and encouragement; his body weakened by improper food and exposure to bad air demands some form of stimulant. He wants to meet his friends and resorts to the saloon as the only place to gratify his longings. Under such circumstances drunkenness ceases to be a vice.

We have, on the other hand, the opinion of John Burns, the English statesman, himself a former wage-earner, who, in his lecture on "Labor and drink" (p. 5), declares:

Drinking is bad enough in the prosperous, well-fed, and comfortable classes, who can mitigate its heavy drain upon their health, strength, and resources by rest, change, and counter-attractions. But on the poor it is an additional load, piled upon their own backs, too often by their own hands, and nearly always at the time they are least able to bear it. From their strength as a class, from their powers of endurance as individuals, and from their capacity as craftsmen, it is a never-ending drain.

On page 12, in speaking of "Poverty and drink," he says:

The theory, dogmatically asserted, that poverty causes drink is rudely shaken by the fact that the drink expenditure per middle and upper class family who have the means, is two and a half times greater than that of the working class family, although the effect is less apparent. But the strongest answer is the statistical fact that as wages rise general drunkenness follows, insanity increases, and criminal disorder due to drink keeps pace with all three. The converse generally holds good, for in rural districts, where wages are low, drunkenness is lower, and insanity due to drink is scarcer. In support of these views and tables, the prison commissioners' report (p. 16, Judicial Statistics, 1890): "A year of great prosperity, 1890, was also a year of great drunkenness." Yet drunkenness in 1890, I am pleased to say, per 100,000, was much lower than in previous periods of prosperity, as for instance in 1884; the year 1875, our busiest year, was the most drunken of any recorded.

It may be urged, in extenuation of these deplorable facts, that the determining cause was the previously low wages; also that it is the sudden rise from rural to urban wages that sweeps the appreciated wage-earner from his simple, sober ways to exciting, heavy-drinking habits. If this be accepted, it diminishes enormously the force of the theory that poverty causes drink. * * *

Industrial prosperity is always the measure of wages, generally the standard of drunkenness, the gauge of insanity, and too often the stimulus of crime. This is strikingly confirmed by that patient, devoted, and capable investigator Mr. W. D. Morrison: "A glance at the criminal returns for a series of years will at once show that crime is highest in summer and autumn—a time when occupation of all kinds, and especially for the poorest members of the community, is most easily obtained—and lowest in winter and spring, when economic conditions are adverse." All these facts, instead of pointing to poverty as the main cause of drunkenness, point the other way.

Wurm stoutly maintains that in Germany higher wages have created a greater demand for the less harmful but more expensive beverages, like wine and beer, and quotes from the "Volkstimme," of Frankfort, that in all trades where there has been a reduction in the working hours alcoholism has diminished, because the men have an opportunity to enjoy nobler pursuits than to sit around in common saloons.

Justice De Lacy, of the juvenile court of Washington, informed the writer that quite a large number of deserted wives, pleading for compulsory support, declare that when their husbands earned from $2.50 to $3.50 a day they led exemplary lives, but now, when they are earning from $4 to $5 a day, a number of days are lost in idleness by the drink habit.

The writer does not pretent to offer an authoritative view, and prefers to adduce the evidence on both sides of the question. He is strongly inclined to the belief, amounting to a conviction, that the

subject is so broad and the evil effects so far reaching as to deserve a systematic and exhaustive study by a special commission.

Reference has been made in a former report to the fact that malnutrition, whether the result of insufficient or improperly prepared food, or the consumption of cold victuals, is a very fruitful cause of intemperance. In our sociological study of 1,217 families it was found that 750 wage-earners carried dinner pails, and 205 were reported as being accustomed to consume alcoholic beverages with their meals. The number in each case was greater among the white than the colored wage-earners. Everyone at all familiar with the subject knows that badly cooked food, especially when consumed from the "cold dinner pail," produces derangements of the stomach and a craving for alcoholic stimulants, which in turn aggravate the original gastric disturbance and readily lead to the drink habit.

In addition to the causes mentioned, the unnecessary number of saloons, not infrequently connected with employment agencies or located in the vicinity of workshops, wharves, and the homes of wage-earners, increase the temptation. Last, but not least, the characteristic American bar—drinks being consumed in rapid succession, aided by the pernicious system of treating—is a very fruitful cause of the drink habit.

REMEDIAL MEASURES.

The remedy is difficult to suggest. Prohibition does not prohibit, and all such attempts are repugnant to the masses and lead to the substitution of even greater evils, such as the drug and other morbid habits. In Doctor Johnson's investigation quite a number of the prisoners admitted that when unable to secure liquor they have resorted to alcohol diluted with water, hot water and sugar, soda water, sarsaparilla, etc. Wood alcohol was stated to be used in the United States Navy, obtained from shellac varnish stolen from the paint room, the shellac being precipitated by water and the fluid poured off and mixed with hot water and sugar. The following substitutes for liquor were also alluded to: Duffy's malt whisky, Johann Hoff's malt extract, Jamaica ginger, Peruna, S. S. S., renewed prescriptions, and forged prescriptions. During my army experience at posts situated within the heart of an Indian country and where it was impracticable to establish grog shops, within a reasonable distance, whisky was brought into the garrison through the mail in various disguises, or in express packages and peddled in 2-ounce vials by the soldiers themselves. Others resorted to the purchase of essence of ginger, lemon, vanilla, bay rum, alcohol, patent and proprietary remedies containing alcohol in various percentages; hence even the most favorable environment failed to prohibit. It was not until the establishment of the canteen system that better conditions were offered. It was the creation of the soliders' club, with the sale of light wines, beers, and nonalcoholic beverages, which reduced drinking to a minimum and promoted not only temperance and contentment, but also lessened immorality and crime.

In spite of the fact that beer and wine drinking, viewed in the abstract, is unproductive of good, quite a number of friends of temperance believe that saloons dispensing light wines and beers should pay a very much lower license tax than those selling stronger alcoholic beverages. They also deprecate the tendency to suppress the sale of beer by the quart, because it is found that the men, instead of "rush-

ing the growler," will purchase whisky by the pint or quart with infinitely more harmful effects.

So long as human nature is weak, and the masses are not properly educated, the substitution of a lesser evil is not only justifiable but will, in the future, as it has in the past, prevent excesses which are fatal to soul and body. At present every effort toward total abstinence merely opposes theory to facts and sentiment to statistics.

While it is true that nearly one-half of the population of the United States is now living under prohibition liquor laws and nine States have prohibition outright, there is no marked diminution in the consumption of alcoholic beverages. One of the immediate effects has been an appalling increase in the number of drug stores in "dry States." The subject was deemed of sufficient importance by Mr. Harry B. Mason, editor of the "Bulletin of Pharmacy," to bring it to the attention of the American Pharmaceutical Association at a meeting held at Hot Springs, September 6, 1908.

Mr. Mason said in part:

We are facing a great world movement. It has been instituted by society for the protection and maintenance of its own interests. It will continue its onward development whether we like it or not, and as pharmacists we are affected in so vital a manner that our future reputation and welfare are largely at stake. Prompt and vigorous measures are necessary if we are to avoid public calumny and disgrace.

Why? For the very simple and apparent reason that a small minority of druggists are willing, nay, eager, to take advantage of the downfall of the saloon and seize upon the business which it is no longer able to continue. In some of the prohibition States, and in most of the "dry" towns and counties, it is recognized that liquor is a medicinal necessity, and the druggist is consequently given the legal right to dispense it for legitimate purposes. Sometimes a physician's prescription is demanded; in other instances it is provided that the sale must be only for "medicinal, chemical, and sacramental purposes," and strict registration of every sale is required; in still other sections, different methods are prescribed, but the fundamental expectation everywhere is that the pharmacist shall observe the spirit of the law and refrain from selling liquor as a beverage.

Now, it is unquestionably wise and proper that, by some method or other, people who need liquor for legitimate purposes should be left with the means of procuring it, and the drug store is the natural and practically the only place to look to in such an emergency.

No article in the materia medica is more useful and necessary than liquor, and it would be unfortunate, indeed, if pharmacists were everywhere denied the legal right of dispensing it. It would be nothing short of a professional disgrace of the most humiliating character if this privilege were to be taken from us through inability on our part to respect it in letter and spirit, and yet this very thing has been done in some States and sections and is threatened in others.

Every county or city association in "dry" territory might well make the matter a local issue, take control of the situation, outline a policy, eject members who violate the law, cooperate with the legal authorities, and convince the public, the newspapers, and the officers of the law that pharmacy is a dignified and honorable occupation which will tolerate no liquor abuses. This, as I see it, would prove the most effective method of remedying the evil and averting the crisis.

As a result of Mr. Mason's address, the association adopted resolutions declaring that any druggist who goes into the illegitimate sale of liquor is a disgrace to the profession and should be ostracized by it, and calling upon the local authorities to assist in exposing and penalizing those druggists who abuse their privileges and who thus drag the name of pharmacy into the mire of infamy and degradation.

Laudable as this effort is, it will prove of little avail until higher moral standards reach all classes, including even the liberal profes-

sions. The American Medical Association has preached for years against the nefarious traffic in secret and proprietary medicines, but in spite of solemn protests and ostracism, the frightful list of such harmful compounds increases at the rate of about 200 a year. Mountebanks and hypocrites are not easily subdued and when compelled to respect the liquor law may have recourse to a number of medicinal preparations which are protected by patents or trade-marks. The following list of medicinal preparations have been analyzed in the office of the Commissioner of Internal Revenue and are classed as compound liquors for the sale of which a special tax is required:

Patent and proprietary compounds containing sufficient alcohol to be intoxicants.

	Alcohol by volume.		Alcohol by volume.
	Per cent.		*Per cent.*
American Alimentary Elixir	16.16	Ginger Tonic	25.31
Angostura Aromatic Tincture Bitters	45.00	Ginseng Cordial	14.86
Aroma Stomach Bitters	19.60	Glycerine Tonic (Elixir Pepsin)	39.72
Aromatic Bitters	42.14	Green's Chill Tonic	37.55
Atwood's La Grippe Specific	32.70	Greiner's Blackberry Cordial	11.05
Augauer Kidney Aid	35.65	Harrison's Quinine Tonic	17.70
Augauer Bitters	34.13	Health Bitters	19.35
Belvedere Stomach Bitters	20.32	Herbton	16.76
Bismarck Laxative Bitters	21.14	Herbs Bitters	14.95
Bismarck's Royal Nerve Tonic	20.67	Jack Pot Laxative Bitter Tonic	24.25
Blackberry (Karles Medicine Company)	16.35	Jarvis Blackberry Brandy	14.60
Blackberry Cordial (International Co.)	19.84	Jerome's Dandelion Stomach Bitters	15.75
Blackberry Cordial (Irondequoit Wine Co.)	19.96	Jones' Stomach Bitters	
Blackberry Cordial (Strother Drug Co)	21.50	Juni-Kola	22.89
Blackberry & Ginger Cordial (Standard Chemical Co.)	25.62	Juniper Kidney Cure	24.21
Black Tonic	44.62	Karlsbader Stomach Bitters	21.56
Bonekamp Stomach Bitters	20.34	Katarno	27.60
Bonekamp Bitters	37.08	K. K. K.	24.12
Brown's Aromatic Cordial Bitters	42.14	Kola and Celery Bitters	20.68
Brown's Utryme Tonic	19.45	Kola Wine	13.54
Brown's Vin Nerva Tonic	27.32	Kreuzberger's Stomach Bitters	40.22
Botanic Bitters	20.44	Kudros	29.33
Celery Pepsin Bitters	18.82	Lee's Celebrated Stomach Bitters	18.11
Cinchona Bitters	27.44	Lemon Ginger	28.88
Clifford's Cherry Cure	35.90	Laxa Bark Tonic	
Clifford's Peruvian Elixir	24.77	Magen Bitters	12.80
Cooper's Nerve Tonic	16.55	Meta Multa	32.98
Crescent Star Jamaica Ginger	42.65	Mikado Wine Tonic	16.80
Coca Wine		Milburn's Kola & Celery Bitters	20.68
Callaya	10.75	Miod Honey Wine	10.55
Cuban Gingerie	31.09	Neuropin	32.02
Dandelion Bitters	30.15	Newton's Nutritive Elixir	18.36
De Witt's Stomach Bitters	23.86	O'Hare's Bitters	44.93
Dr. Brown's Blackberry Cordial	29.04	Obermueller's Bitters	16.56
Dr. Brown's Tonic Bitters	19.04	Old Dr. Jacques Stomach Bitters	40.02
Dr. Hopkin's Union Stomach Bitters	15.82	Old Dr. Scroggin's Bitters	24.74
Dr. Hoffman's Golden Bitters	26.30	Our Ginger Brandy	26.24
Dr. Sterki's Ohio Bitters	21.67	Ozark Stomach Bitters	3.10
Dr. Dade's Blackberry Cordial	28.84	Panama Bitters	32.83
Dr. Bouvier's Buchu Gin	30.83	Pepsin Stomach Bitters	34.96
Dr. Fowler's Meat & Malt	33.70	Peptonic Stomach Bitters	23.12
Dr. Gray's Tonic Bitters	18.30	Pioneer Ginger Bitters	11.54
Dr. Hortenbach Stomach Bitters	15.89	Quinquina Dubonnet	18.74
Dr. Worme's Gesundheit Bitters	27.92	Rimsovo Malto-Sove Vino Chino	17.38
Dr. Rattinger's Bitters	27.10	Rockandy Cough Cure	23.85
Dubonnet		Royal Pepsin Tonic	19.80
Dubonnet Wine	18.74	Scheets Bitter Cordial	18.12
Duffy's Malt Whiskey (Whiskey)		Severa's Stomach Bitters	22.66
Ducro's Alimentary Elixir	23.01	Sirena Tonic	19.92
Elixir of Bitter Wine (Pleasant Tonic Bitters Co.)	16.94	Smart Weed	11.94
Elixir Callaya	22.96	Smith's Bitters	34.41
Eucalyptus Cordial	9.18	Steinkonig's Stomach Bitters	32.05
Ferro China Bascal	22.10	St. Raphael Quinquina	18.88
Ferro China Bissler	26.87	Strauss Exhilarator	16.33
Ferro Quina Bitters	16.96	Tatra (Latra)	22.90
Fine Old Bitter Wine	18.35	Tolu Rock and Rye	30.08
Gastrophan	26.10	True's Magnetic Cordial	26.09
Gentian Bitters	30.95	U-Go	32.14
Genuine Bohemian Malted Bitter Wine Tonic	13.28	Uncle Josh's Dyspepsia Cure	30.09
Gilbert's Rejuvenating Iron and Herb Juice	23.81	Warner's Stomach Bitters	19.67
		Westphalia Stomach Bitters	31.96
		White's Dyspepsia Remedy	17.34
		William's Kidney Relief	27.09
		Zeman's Medicinal Bitter Wine	13.00

The percentage of alcohol was ascertained from the Commissioner of Internal Revenue in a communication dated November 28, 1908.*

On the whole the problem must be solved by educational methods, and hygiene offers many valuable suggestions. It teaches that intemperance is a vice the result of a violation of natural laws, and in order to eradicate the evil and far-reaching consequences we must endeavor to remove the primary causes. Reference has been made to mental and physical fatigue as an important predisposing factor. The indications are to regulate our life so that we do not burn the candle at both ends, take more rest, more recreation, and more interest in genteel amusements calculated to counteract the influence of saloons. The eight-hour labor law is indicated in the interest of health and morals. Quite a number of clear-headed employers appreciate their responsibility in this matter and have appointed social secretaries, "whose duty it is to watch not only over the health, comfort, and happiness of the force during working hours, but also to obtain sufficient knowledge of their private life to be a real help in times of trouble. The secretary establishes luncheon rooms, rest rooms, mutual aid associations, thrift funds, and penny provident banks. Besides the usual betterment features the secretary also arranges many forms of amusements, such as dances, lectures, and musicales. If this functionary did nothing more than to teach working people how to enjoy themselves in a sane, healthy way the work would be justified. * * * The cardinal principle of the social secretary's gospel are sanitation, recreation, and equalization." (Review of Reviews, August, 1906.)

Hygiene long ago recognized that dust-producing occupations, exposure to extremes of heat and cold, and to the inhalation of offensive gases, etc., are fruitful causes of disease in general and the drink habit in particular, and has also pointed out how the injurous effects may be prevented or at least mitigated. Until this is accomplished by universal factory sanitation, pure drinking water and nonalcoholic beverages should be furnished by the employer. Indeed, efforts are being made in Germany to limit in every reasonable way the consumption of alcoholic beverages by the establishment of canteens in industrial plants for the sale of coffee, tea, cocoa, milk, hot soups, and soft drinks of every description, all of which allay thirst, while many are stimulating without the injurious effects of alcohol.

In 1905 the breweries of Munich and other Bavarian cities stopped the issue of free beer to employees, but allowed an extra compensation of 25 cents a day for beer money. The consumption has been reduced from an average of 6 quarts to 1¾ quarts for each employee a day.

Money spent in temperance saloons, especially for warm, wholesome food and drinks, will be a good health investment, provided, of course, they are consumed within reasonable limits. It may be stated in general terms that while coffee, tea, coca, spices, and condiments in moderation stimulate the central nervous system, and increase tem-

* Compiled from Circular No. 713, December 8, 1907, and No. 727. Circular No. 713 contains the following paragraph: "It must be clearly understood, however, that the list here given is not exclusive and does not purport to give the names of all the preparations for the sale of which special tax is or may be required, but embraces only those which have been analyzed by this office, and held to be insufficiently medicated to render them unsuitable for use as a beverage. * * *"

porarily the elasticity of mind and body, their abuse is fraught with danger, and we may have "coffee and tea topers" who suffer from diseases of the nervous system.

One of the most effective weapons against intemperance will be found in the thorough training of our girls in domestic science, preferably in the public schools. Apart from the fact that the average expenditures for food are larger than for any other single item, the question of well selected and properly cooked food and of "home making" generally is of the utmost importance to the health and morals of the community. No woman can aspire to higher accomplishments than to be a good cook; and a true "housewife" can do more for the physical and moral development of her family, and the cause of temperance, than all the moralists combined. A thoughtful mother, apart from seeing that her family is supplied with good food, will also make the home attractive, inculcate æsthetic home tastes, and, above all, a spirit of thrift and economy. The habit of saving money can not be too strongly urged upon children, and when once strongly rooted offers one of the best safeguards against expenditures for immoral purposes. The beneficent effects of the provident savings system are fully recognized by charity workers and quite a number of American cities have introduced the stamp-saving system into the public schools.

Much may be done for the cause of temperance and general sanitation by introducing the subject of hygiene as a part of the curriculum in our schools and colleges, so that the children, the future parents and citizens, may acquire accurate knowledge upon this and other subjects in relation to health and disease.

Apart from educational methods we should bear in mind that man is essentially a social animal and if he asks for bread we have no right to offer him a stone. He needs opportunities for recreation to vary the monotony and turmoil of life, and many a young man, with the best of intentions, has found his way to saloons and places of evil resort for lack of better opportunities. When we supply clean and decent amusements we can indeed hope for a higher cultivation and moral training of the male youth of all classes. The writer notes with gratification that such an effort was made in 1902 by the establishment of the "Everett Clark Club House," the gift of Mrs. Potter, wife of the Bishop of New York, and her son, Lieutenant Clark, U. S. Army, to the members of Grace Episcopal Church, Elizabeth, N. J. The special interest of this gift lies in the fact "that it is a signal example of intelligent contribution to the needs of the whole man—religious, physical, social, and æsthetic. Under one roof there is a chapel, kitchen, restaurant, dining, reading, card, committee, smoking, shuffle board, and billiard room, a swimming tank and other baths, gymnasium, running track, and bowling alleys." (Outlook.)

Similar efforts have been made in connection with our local churches, and it is to be hoped that the time is not far distant when every church and school in the land will also become a social center.

The writer is familiar with the excellent results obtained in one of the Boston churches, in cooperation with the medical profession, in the cure of consumptive and nervous invalids. While not deprecating such efforts, it must be conceded that the most substantial and permanent results will be achieved by preventive rather than curative

measures, which primarily involves the removal of the cause. So, for example, every effort to diminish intemperance, the drug habit, and sexual excesses will reduce the number of nervous, mental, and moral wrecks. Likewise every effort to improve the housing conditions and standards of living will diminish the number of consumptives.

It is sincerely hoped that the wage-earners of this country, in addition to cultivating home life and higher ideals, will hold their meetings in buildings wholly divorced from saloons, along strictly ethical lines, and in every way in keeping with the dignity of labor. There is certainly room for special buildings dedicated to the improvement of artisans and their industrial and social conditions.

RECREATION AND INEXPENSIVE AMUSEMENTS.

[By MABEL T. BOARDMAN.]

That all people, from the lowest savages to the most civilized races, crave recreation and amusement is a fact that is recognized by all, but the importance of providing sane and wholesome entertainment to satisfy this craving is too much overlooked in the case of the least resourceful people. The playground system, boys' and girls' clubs, and social settlement entertainments are fortunate movements along this line as far as children are concerned, but too little has been done to meet this same desire in the older generation. The habits of intemperance and kindred vices are formed not in a man's working but in his recreation hours. The saloon has been frequently called "The poor man's club," and it is quite natural that a man's social inclination should take him where he may find congenial company. He desires the recreation of a chat with his fellow-men. His home is too small, or too much occupied by his family, for him to gather with them there. The factories, or the other places where he may work, are closed, and where save in the saloon can he find the companionship he desires? He can not frequent a saloon without becoming its patron, and while at first he seeks it merely for the sake of social companionship, he may become its habitué for the sake of drink.

It is unfortunate that in this country there exist so few places like the beer gardens and halls of Germany, where a man can take his family and at a very small expense listen to good music, gossip with his friends, and spend a sane and wholesome evening. If only the philanthropists of a city would build and partially endow some large amusement hall, so constructed that in summer it could be turned into an almost open-air garden, where every evening a good orchestra would provide popular music, or some unobjectionable vaudeville performance be given, while the men could sit talking and smoking around the tables, their families gathered about them, a great deal could be accomplished in the way of keeping them from the temptations the saloon affords. Young men and women of the families could have a respectable place in which to meet, and, with some oversight, arrangements might be made for part of the large hall to be devoted to dancing. Soft drinks and beer could be sold. Men and

women whose daily labor may be of a nature that requires little mental work would find the daily task much lightened, for while their hands are occupied with routine work their minds would be filled with the memories of a pleasant yestereven or the anticipation of another one to come.

The dreary and monotonous home lives of many of the women would not only be lightened by the opening of such great halls during the afternoon hours, but the opportunity on cold and rainy days in winter, or on the hot days in summer, of keeping their children about them in a physically and morally healthful atmosphere would prove of great benefit. The influence of the mother over her children is far greater than can be that of the father, whose work keeps him so much occupied during the day, and anything that can help to improve and better her existence can not fail to directly affect that of her children. For a time taken out of the drudgery of her daily life amused and entertained, much of the dull and tired feeling that often makes her cross, nagging, and irritable will depart, and the home will become a far happier place for the husband and children.

Educational departments have in many cities wisely provided public lectures on a great variety of subjects, mainly of an educational character, but human nature does not wish to devote all its hours of recreation to improving its mental conditions. It desires relaxation; it wants to be amused. The children of the larger growth need their play time, too, and it is to the satisfying of this craving on the part of the least resourceful people that too little consideration has been given. Of themselves they can provide little or nothing, and the natural desire for amusement makes them too often the prey of the saloon, the cheap sensational theater, or the morbid shows of the penny-in-the-slot character. Thousands of boys and girls leave school every year at the most formative period of their lives, and the nature of the recreations and amusements they indulge in will have a lasting influence and may properly be considered as having still to do with their education in a broad sense. The enormous growth of the 5 and 10 cent theaters and their popularity in all of our large cities is sufficient proof of the need of cheap amusements. When the entertainments provided by them are sane and wholesome, even though not of the most elevated nature, they should be encouraged, but certain powers of supervision over these places should lie in the hands of some civic authority, possibly the board of education.

Public lectures of a popular nature, travel monologues with stereopticon views, etc., should be provided by the educational department of the city and the public schools used for this purpose in the evenings. Doubtless volunteers for many such lectures could be secured, so that with lecturers and places provided free of cost, the expense need not be great. The parish halls, chapels, and Sunday school buildings of churches might also be utilized for this purpose.

If the importance of healthful and wholesome amusement to gratify this demand of human nature is recognized and provided for, there is no doubt there would result a marked reduction of intemperance among the least resourceful people and a general uplift in their social condition.

CHAPTER X.

THE DRUG HABIT.

The writer, as a member of a committee of the Medical and Surgical Society of the District of Columbia, appointed in 1896 to investigate the extent of the opium habit, had occasion to witness the physical and moral impoverishment which results from the use of drugs which enslave.

The report of the committee was published as Senate Document No. 74, Fifty-fourth Congress, second session, and shows that during the ten years ending June 30, 1895, 7 persons died from the opium habit, 36 persons died from accidental or negligent opium poisoning, and 36 committed suicide with opium or its preparations. Of the accidental deaths 12 were under 5 years of age, while the remainder were over 20 years of age.

The statistics have been extended by Dr. H. C. Macatee, and are as follows:

Year.	Deaths from opium habit.	Suicides from poisoning by—						Accidental or negligent fatal poisoning by—						Deaths from alcoholism.	
		Narcotic poisons.		Corrosive poisons.		Miscellaneous, including carbolic acid and gas.		Narcotic poisons.		Corrosive poisons.		Miscellaneous, including carbolic acid and gas.			
		Under 5 yrs.	Over 5 yrs.	Under 5 yrs.	Over 5 yrs.	Under 5 yrs.	Over 5 yrs.	Under 5 yrs.	Over 5 yrs.	Under 5 yrs.	Over 5 yrs.	Under 5 yrs.	Over 5 yrs.	Under 5 yrs.	Over 5 yrs.
1886	1	....	2	....	....	....	....	....	1	....	....	....	....	....	....
1887	....	....	1	....	....	....	....	2	....	....	....	....	....	....	....
1888	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1889	2	....	1	....	....	....	....	....	1	....	....	....	....	....	....
1890	1	....	5	....	....	....	....	....	1	....	....	....	....	....	....
1891	2	....	3	....	....	....	....	2	1	....	....	....	....	....	....
1892	....	....	6	....	....	....	....	....	3	....	....	....	....	....	....
1893	....	....	4	....	....	....	....	3	5	....	....	....	....	....	....
1894	....	....	5	....	....	....	....	2	9	....	....	....	....	....	....
1895	1	....	9	....	....	....	....	3	3	....	....	....	....	....	....
1896	....	....	7	....	3	....	2	1	4	....	1	3	....	....	35
1897	....	....	4	....	9	....	10	....	4	3	2	1	12	....	25
1898	....	....	4	....	7	....	2	2	5	1	....	....	[a]2	....	7
1899	2	....	2	....	3	....	1	1	6	1	1	....	1	....	17
1900	....	....	3	....	6	....	6	....	4	....	2	....	3	....	21
1901	2	....	9	....	1	....	10	....	9	1	....	1	[b]10	....	34
1902	1	....	....	....	1	....	12	[c]4	3	....	2	....	....	....	15
1902 (July 1 to Dec. 31)	....	....	1	....	1	....	4	....	1	....	....	....	1	....	9
1903	3	....	[d]6	....	3	....	14	[d]1	[d]3	....	....	....	18	....	23
1904	....	....	[d]7	....	3	....	20	[d]2	4	....	....	6	[e]11	....	22
1905	....	....	[d]4	....	....	....	19	....	....	1	....	4	9	....	24
1906	....	....	1	....	1	....	20	....	[d]3	....	....	1	3	....	23
1907	....	....	[d]3	....	2	....	[f]31	....	....	2	....	3	5	....	32
Total	15	....	87	....	40	....	151	23	70	9	8	24	76	....	287

That part of the table for the years ending June 30, 1886 to 1895, inclusive, was compiled by Doctor Kober, and refers to opium only.

[a] One from cocaine.
[b] One from paraldehyde.
[c] One from quick pain killer (opium).
[d] Eleven from opium.
[e] One from chloralhydrate.
[f] Nineteen from gas.

In addition there were treated during the same period in the four hospitals of this city 125 cases of opium poisoning and 70 patients for the opium habit. Doctor Macatee has continued this investigation up to date and finds that during the last nine years 256 patients have been treated for the opium habit in seven of our hospitals, and 62 patients for the cocaine habit in three of our hospitals. The report of the committee referred to says:

> Without a most exhaustive collective investigation it is impossible to even estimate the number of persons treated by physicians for acute or chronic opium poisoning who may recover from the immediate effects of the drug, or who have died victims of the opium habit and in which the cause of death may have been assigned to some remote pathological effects of the drug.

The investigation of the committee revealed, however, the fact that "there are quite a large number of persons in this city who have become the victims of the opium habit, and that the different preparations of the drug are used in the following manner:

1. The hypodermic injection of morphia.
2. The use of morphia by the mouth and rectum.
3. The use of alcoholic preparations of opium by the mouth.
4. The use of gum opium by the mouth (opium eating).
5. The use of the extract of opium by inhalation (opium smoking).

In regard to the actual extent of the morphine habit and the amount consumed, either by the hypodermic method, by the mouth or rectum, it is difficult to present any definite data, but, judging from the statements of our pharmacists, there is scarcely one who does not recall one or more victims to the drug, and, while many refuse to sell morphia in unusual quantities, it is evident from their sales, general observations, and calls for the drug, that the habit is widespread; some of the victims use as high as 1 dram of morphia a day, one store alone selling about $100 worth of morphia a month.

Quite a large number of pharmacists report sales in unusual quantities of the alcoholic preparations of opium, such as McMunn's Elixir, laudanum, papine, Squibb's Mixture, and proprietary or secret medicines containing opium, the demand for McMunn's Elixir being especially active, while paregoric and Squibb's Mixture supply the wants of many victims to the use of narcotics.

The use of gum opium (opium eating or chewing) is not so very common. Nevertheless, a sufficient number of sales in suspicious quantities reveals the existence of habitués to this form of the drug. In regard to the use of the extract of opium by inhalation (opium smoking) the data are quite meager. Pharmacists have occasional calls for the extract, but are of the opinion that the bulk is supplied by Chinese merchants. Dr. Wade H. Atkinson recently reported to this society a fatal case from opium smoking in the person of a white man aged 28. Doctor Atkinson, in presenting the case, says:

> I know of about 20 in this city, and I have asked a few others who could most probably estimate the number correctly. A popular drug clerk estimates the smokers at 150. A very noted clerk in a lunch room who is well acquainted with several smokers consulted with them and estimated the number at 500. A special detective in the police department says he thinks there are not more than 20 smokers, and only one "joint" here. Chinese are not considered in these estimates. I believe a fair average of 150 or 200 habitual smokers are in Washington, and know of two "joints."

Investigation into the causes of the opium habit leads to the conclusion that one class of subjects have contracted the habit by the

use of the milder preparations of opium, such as McMunn's Elixir, paregoric, Squibb's Mixture, and some of the various proprietary or secret remedies usually employed as domestic remedies.

Another class have evidently acquired the habit by the constant use of prescriptions containing opium or its preparations for the relief of pain, the individuals being at first quite unconscious of the enslaving nature of the drug. Competent and experienced pharmacists are of the opinion that prescriptions containing opiates are more frequently refilled than other prescriptions; that copies of such prescriptions are frequently multiplied for friends, and that suppositories containing opiates are commonly renewed.

The social condition of the foregoing classes appears to be of a mixed character, and includes all grades of society, the rich and intellectual predominating. Another class of persons belong to the moral degenerates, or fast men and women, who have acquired the habit by contact with opium habitués and through solicitation, invitation, and persuasion of fallen victims to the vice. In the opinion of many prominent pharmacists the habit, from whatever cause, is readily established, because opium and its preparations are altogether too easily obtained. Before considering the question as to the extent to which the State should exercise control in the interest of public health over the sale of poisons reference should be made to the obligations of the physicians in the matter.

There can be no successful concealment of the fact that the prolonged and indiscriminate use of opium and its preparations, especially in neurotic subjects, has been a most fruitful cause of morphinism, and while inquiry reveals a decrease in the amount of morphia prescribed by the physicians, there are still a goodly number of so-called "morphine doctors" who have received this appellation by pharmacists because they are in the habit of making it one of the ingredients in nearly all of their prescriptions.

In view of the fact that prescriptions containing opiates are frequently refilled and taken in increased and unauthorized quantities, and may thus establish a habit, in the absence of legal restrictions all physicians should endeavor to reduce the danger from morphinism to a minimum by a judicious employment of the drug and careful supervision of the patient.

While some pharmacists believe that the request of the physician on the prescription "not to be renewed" would be generally respected, others believe that the prescription, having been declared the personal property of the patients, is subject to their orders only. It would possibly be wise not to incorporate opium and its preparations in any prescription, and when its use is indicated it might be dispensed by the physician without the knowledge of the patient as to the nature of the remedy. But perhaps the easiest way to solve the question would be to follow the lead of the New York legislature, which, in June, 1887, enacted a law that no pharmacist, druggist, apothecary, or other person shall refill more than once prescriptions containing opium or morphine, or preparations of either, in which the dose of opium shall exceed one-fourth grain or morphine one-twentieth grain, except with the verbal or written order of a physician.

The committee submitted drafts of two bills for consideration which it was believed would go far toward preventing the spread of

the opium habit, and also expressed the opinion that with regard to the sale of proprietary and secret medicines containing poisonous drugs the contents should be clearly expressed on the label, and the word "poison" added, as required in the sale of poisons under existing acts. No action was taken for several years upon these recommendations, which were clearly in the interest of public health and morals. In the meantime the cocaine habit also assumed alarming proportions, so that Major Sylvester, chief of the police, in his annual report for 1904 (p. 27) called attention to the fact that examination of the poison register of one dealer's place alone disclosed 40 sales in one day. The goods having been put in properly labeled envelopes, there was no violation of the law. In his report for 1905 (p. 36) he pointed out that parties have been apprehended for peddling the drug from door to door, and that some worthy and capable people have wrecked their own lives and made that of others miserable. In each of his reports he urged appropriate legislative action.

A new pharmacy law was finally enacted and approved May 7, 1906, which placed greater restrictions upon the sale of poisons in general and the habit-forming drugs, such as opium, morphine, cocaine, chloral in particular, and also made the filling of prescriptions containing such drugs in certain doses, except upon the written order of the signer of the original prescription, unlawful.

The chief of police, in his report for 1906, on page 23, says:

> The cocaine habit and sale is the most difficult to cope with, and the law should be so complete as to prohibit other than licensed druggists, physicians, dentists, or veterinarians having it in his or her possession except on a physician's prescription, and then the package to bear the name of the physician and the patient for whom prescribed.

In the report for 1907 he states "that the sale of cocaine has been largely reduced, but there are many who dispense the drug under cover."

Dr. Paul B. Johnson, in his investigation of 175 prisoners in the Washington workhouse, found that 15 had intimate knowledge of the use of cocaine. "Cocaine was described always as used by sniffing the powder into the nostrils, either from the package, or from the palm of the hand, or from the fingers like snuff, or most often by dipping a short quill into the powder and placing the other end to the nostril. It was stated as easily purchased in drug stores or in the rear of barrooms." Dr. Lyman F. Kebler, Chief of the Division of Drugs of the Bureau of Chemistry, United States Department of Agriculture, in a recent paper on the "dope question," refers to the cocaine habitué as socially inclined, offering a friend a "sniff." * * * In fact, whole circles assemble to enjoy a cocaine spree, where the dope, commonly known as "coke," is passed from one to another to take an allotted sniff. In speaking of the effects, Doctor Kebler states that "cocaine in some cases transforms otherwise safe and tractable citizens into dangerous characters, and in most instances wrecks the individual and all depending on him, as well as jeopardizes the lives of many."

Major Sylvester, in a letter dated December 6, 1908, writes as follows:

> Investigation shows that there were about a half dozen druggists making a specialty of the sale of cocaine and other drugs, and a dozen or more selling

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such to a few customers; the other druggists in the District would not make such sales except to persons whom they had reason to believe would use the same for legitimate purposes, and some of them would not handle it at all.

Upon the passage of the present pharmacy law, such sales were stopped by druggists, except a limited number who continue the sale to customers upon whom they could rely not to betray them, and who were actuated by sympathy rather than other motives; three or four others continued the sale, only to be apprehended and fined.

The member of the force detailed as inspector of pharmacy has had occasion to bring to court three physicians for writing prescriptions for morphine and cocaine, all of which were aggravated cases, and he has given notice to others not to indulge in the practice.

The department, in this work, has had the cordial cooperation of physicians generally, and finds that in their opinion the drug habit, especially morphine, is due largely to the injudicious prescribing of drugs, and it has evidenced an inclination on the part of physicians to curtail the use of them.

In the course of his investigation the inspector found that morphine fiends, with two exceptions, had become addicted to the use of the drug through sickness or injury; one of those excepted stated he formed the habit through no other cause than that of the lowest depravity, while the other stated he became addicted to its use through having it prescribed by a physician after getting over a long spree.

I am informed that there are one or two physicians who have a few patients whom they feel in duty bound to supply with the drug.

It is believed that if the law could be made stringent enough to put the sale of morphine beyond the reach of such persons, after they had been treated under confinement, they would make useful citizens.

The morphine, laudanum, and kindred drug users, according to the observation of the inspector of this department, have been greatly reduced in number through the efforts of the medical profession.

The habit of opium smoking has never become serious in this city; it was slightly increased with the passage of the pharmacy law, as the drug is easier to get from Chinamen, who are hard to detect. It is confined principally to degraded persons, both white and black, who are beyond reformation. Arrests are made by the police and penalties imposed upon the Chinese engaged in the traffic. I think if the penalties inflicted were a little more severe the effect would be more ample.

The inspector states that in the course of his investigation he has learned of no foreign white people who are addicted to the drug habit. He finds that the cocaine habit is by far the greatest menace to society, because the victims are generally vicious. The use of this drug superinduces jealousy and predisposes to commit criminal acts. In districts where druggists formerly dispensed cocaine disorder has decreased so noticeably that it is commented upon by the neighbors and the police officers on the beats; it has also had the effect that a large percentage of persons using cocaine will not make an effort to get it when it is accompanied by the risk of arrest.

The present source of supply is mainly through druggists who are not now in the business, and clerks who are employed at drug stores, who, it is believed, deliver it to persons to peddle when they can find anyone who will purchase. Others procure it from the near-by suburban towns, localities without this jurisdiction.

It is quite a difficult matter to convict these people, as possession of the drug is not held to be sufficient evidence. In Virginia possession is held to be evidence of intent to sell, and is punishable by not less than one nor more than five years in jail. Under the present law there is no distinction between a clerk and a proprietor; if a person is registered he can purchase any amount. No person other than a druggist should have the privilege of handling cocaine.

It is believed that there are about a dozen persons who peddle cocaine from time to time, and those who use it are numbered approximately by the inspector's report at about 100. The number of persons who use morphine can not be approximated, as they are distributed throughout all classes of society. Many who use the drug are not known as such habitués outside of their own homes. There have been a number of peddlers or writers of bogus prescriptions arrested and fined from $50 to $200, or sent to jail. My information is that the sale of cocaine is about one-tenth of what it was before the present law went into effect. * * *

MEDICINAL PREPARATIONS WHICH CONTAIN HABIT-FORMING DRUGS.

Doctor Kebler says:

There are upon the market many medical preparations which contain as ingredients habit-forming drugs. Such drugs are alcohol, opium and its derivatives, notably morphine, codeine, and heroin; cocaine, chloral, *Cannabis indica*, acetanilid, etc.

The presence of most of the habit-forming drugs, under the provisions of the pure food and drugs act, must now be declared upon the label of drug products, and the public is thus made aware to some extent of the nature of preparations containing these agents. The drug products which contain opium and it derivatives most frequently are the painkillers, cough and consumption cures, and soothing sirups.

Below is given a list of some of the medicinal preparations which contain habit-forming drugs other than alcohol:

Coco-Bola (cocaine).
Godfrey's Cordial (opium).
Harrison's Opium Elixir (opium).
Wright's Instant Relief (opium).
Crossman's Specific Mixture (opium).
Petit's Eye Salve (morphine).
Brou's Injection (morphine).
Carney Common Sense Cure (morphine).
Habitina (morphine).
Anglo-American Catarrh Powder; Agnew's Powder (cocaine).
Captol (chloral).
Gowan's Pneumonia Cure (opium).
Dr. James' Soothing Syrup (heroin).
Mrs. Winslow's Soothing Syrup (morphine).
Children's Comfort (morphine).
D. D. D. Remedy (chloral).
Mexican Oil (opium).
One Day Cough Cure (morphine, *Cannabis indica*).
Tousley's Sneezeless Snuff (morphine).
Watkin's Anodyne (heroin).
Dr. Drake's German Croup Remedy (opium).
Dr. Seth Arnold's Cough Killer (morphine).
Piso's Cure (*Cannabis indica*).
Boschee's German Syrup (morphine).
Shiloh's Cure (heroin).
Tubercine (opium).
Hooper's Anodyne; the Infant's Friend (morphine).
Pierce's Smart Weed (opium).
Colwell's Egyptian Oil (opium).
Maguire's Compound Extract Benne (morphine).
Dr. Fahrney's Teething Syrup (morphine).
Jayne's Expectorant (opium).
Taylor's Sweet Gum and Mullein Compound (morphine).
Victor Lung Syrup (opium).
Dr. Moffett's Teethina; Teething Powders (opium).
Tucker's Asthma Cure (cocaine).
Rexal Cholera Cure (opium).
Fruit-Lax (morphine).

DANGER OF SOFT DRINKS CONTAINING HABIT-FORMING DRUGS.

In this connection attention is directed to the danger of soft drinks containing caffeine, extract of kola nut, and extract of coca leaf, the active principle of the two latter being cocaine. According to Doctor Kebler, see Appendix, there are now nearly one hundred different medicated soft drinks on the market.

These beverages are extensively advertised, some, in fact, as headache remedies and nerve tonics, and sold at nearly every soda-water fountain or as carbonated goods in all parts of the country without the slightest warning to the public of the harmful ingredients contained therein. We restrict the use of coffee and tea in children and delicate nervous individuals, and yet these same persons frequent the soda fountains, regale themselves with soft drinks, quite unconscious of their contents, experience the stimulating and re-

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freshing effects and soon fall victims to the habit, so that even "Coca Cola fiends" have come into prominence. We have seen how the opium habit may be acquired by the use of the various proprietary or secret preparations (pain killers), usually employed as domestic remedies, and so the cocaine habit may be developed by the use of these much-lauded soft drinks.

It is a significant fact that Mr. Vanzant, the special police officer charged with the execution of the pharmacy law, with the exception of the Chinese opium fiends, has never encountered other foreigners who are addicted to the drug habit. This may be accounted for by the fact that nowhere is the habit of self-medication with secret or proprietary medicines for each and every ailment so widespread as in this country. No wonder that insanity and diseases of the nervous system are on the increase, and that the physical, moral, and mental wrecks of the alcohol and drug habit continue to swell the number of dependents in hospitals, insane asylums and other public institutions.

From a careful analysis of the evidence it is apparent that the sale of habit-forming drugs is still carried on through the instrumentality of (1) unscrupulous local dealers, (2) depraved and unscrupulous local physicians, and (3) through dealers, physicians, agents, and peddlers located in other jurisdictions.

The writer has reached the conclusion that Major Sylvester's proposed amendment to the present law will not prove effective unless a law is enacted permitting the revocation of a license to physicians, dentists, and veterinarians whenever, in the judgment of the court, such persons are abusing the privilege of prescribing these drugs. A law should likewise be enacted regulating the transportation of habit-forming and poisonous drugs in interstate and foreign commerce, as contemplated by House Res. 21982, introduced by Mr. Mann, May 12, 1908.

REMEDIAL MEASURES FOR THE VICTIMS OF THE ALCOHOL AND DRUG HABIT.

The reports of the chief of police show that during the five years' period ended June 30, 1908, there were 27,985 arrests for intoxication in the District of Columbia, an average of 5,596 per annum. Of these, 18,075 were arrests for simple intoxication, and 8,288 arrests for intoxication and disorderly conduct. There being no law against simple intoxication, those detained for this cause are released by the police after they have sobered up. Such cases are taken up as obstructions and for their own security and welfare, and of these 18,075 cases no doubt "many were saved from injury, robbery, and sickness, if not from death." In spite of precautions taken by the police, a number of deaths from acute alcohol poisoning have occurred in police cells, indicating the necessity of greater discrimination in the care and treatment of such cases.

There were 1,622 arrests, an average of 324 per annum, on the charge of habitual drunkenness, and these, together with those charged with disorderly conduct, are held for the court, and many find their way into the workhouse or jail. It is lamentable that 15 of the 675 arrests of persons under the age of 21 years were arrested as "habitual drunkards."

Number of arrests in the District of Columbia for intoxication, and intoxication coupled with disorderly conduct, for the five years ended June 30, 1908.

	Under 21 years of age.				Over 21 years of age.			
	Male.	Female.	White.	Colored.	Male.	Female.	White.	Colored.
1904.								
Habitual drunkard	2	.....	2	.....	214	12	188	38
Intoxication	60	4	45	19	2,978	150	2,457	671
Intoxication and disorderly	60	20	17	63	1,581	201	945	787
1905.								
Habitual drunkard	3	.....	2	1	261	13	211	63
Intoxication	59	4	47	16	3,265	206	2,674	797
Intoxication and disorderly	69	16	29	56	1,469	198	986	681
1906.								
Habitual drunkard	1	.....	1	.....	272	18	227	63
Intoxication	55	9	37	27	3,529	241	2,883	887
Intoxication and disorderly	44	19	20	43	1,518	236	976	778
1907.								
Habitual drunkard	4	.....	2	2	413	25	341	97
Intoxication	50	8	27	31	3,521	236	2,870	887
Intoxication and disorderly	51	25	27	49	1,246	182	692	736
1908.								
Habitual drunkard	4	1	3	2	340	29	273	106
Intoxication	50	4	29	25	3,395	251	2,775	871
Intoxication and disorderly	35	13	17	36	1,215	135	684	666
	547	128	305	370	25,167	2,143	19,182	8,128

Doctor Macatee's investigation shows that during the past nine years 9,510 patients were treated in the hospitals of the city of Washington for alcoholism; 409 for delirium tremens; 256 for the opium habit, and 61 for the cocaine habit; the majority of these were treated at public expense.

An investigation of the records of the Board of Charities reveals the fact that the daily average number of insane chargeable to the District of Columbia has increased from 1,035 in 1901 to 1,317 in 1908. The board, recognizing that the alcohol and drug habit are two of the best known causes of insanity, in 1907 made provisions, in connection with the old almshouse building, for the cure and treatment of such habitués among the dependent classes. A bill introduced by Senator Gallinger, April 6, 1908, is now pending before Congress, making habitual drunkenness, the habitual use of opium or other narcotic drugs a misdemeanor, punishable by a fine or incarceration in the hospital for inebriates for not longer than two years. The act contemplates a rational care and treatment for the cure of the habit, which is best secured by a good dietetic and hygienic regimen, followed by some useful occupation as soon as the patients are able to work, so as to make them self-supporting during the period of abstinence and restraint. The former system of confining such persons in the workhouse and jail is cruel and wholly ineffective.

The crying need for compulsory restraint has been pointed out by the chief of police over and over again, and the appeal for humane and scientific treatment of husbands, fathers, brothers, and wives is

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not of recent date. As a matter of fact,* Congress, in an act approved March 30, 1876, known as "An act to incorporate the Washington City Inebriate Asylum in the District of Columbia," approved the principle of compulsory restraint and treatment of inebriates. This act provided for the organization of a private institution authorized to receive both free and pay patients, and provided for commitment by court to said institution. * * * Apparently the incorporators never organized the institution as authorized in the act.

ADVERTISED HABIT CURES.

It is high time that some rational method for the permanent reclamation of these unfortunate victims be adopted in this and other communities. As it is now, the rich and poor alike fall an easy prey to advertising charlatans, who profess to cure the drug and alcohol habit, when as a matter of fact these so-called drug cures merely aggravate the habit and never cure it, and in the case of the alcohol cures, the patients' stomach and digestion are often permanently injured and no real good is accomplished. Mr. Samuel Hopkins Adams, in Collier's Weekly, September 22, 1906, published a list of 16 advertised cures for the opium habit when in each case the remedy contained morphine, and says:

The whole purpose is to substitute for the slavery to the drug purchased at the corner pharmacist, the slavery to the same drug disguised, purchased at a much larger price from the "doctor" or "institute" or "society." It was hoped that with the enactment of the pure-food law, which requires that the amount of habit-forming drug in any medicine be stated on the label, such nefarious practices would cease. Imagine my surprise at the audacity of a firm, when shown by Doctor Kebler a preparation known as "Habitina," recommended as a cure for all drug addictions, etc., when the label disclosed the fact that 1 ounce of the solution contains 24 grains of morphine.

Mr. Adams mentions a remedy procured from the Rev. W. N. Richie, D. D., 156 Fifth avenue, New York, which contained 2.12 grains of crystallized morphine per dose; the ordinary dose for medicinal purposes is from one-eighth to one-fourth of a grain. No wonder this courageous writer speaks of the opium, morphine, and cocaine cure quacks as the "wreckers who lure their victims to destruction by false signals." Nor are we surprised that one of these victims wrote to Mr. Adams:

When I tried to stop the remedy I found I could not and it was worse than the morphine itself. I then went back to plain morphine, but found that I required twice as much as before I took the cure. That is what the morphine cure did for me.

In the appendix will be found Doctor Kebler's list of 52 alleged cures for drug and liquor habits. As an analytical chemist, he confirms the belief, long since held by the profession, that the drug cures in almost every instance contain a generous proportion of an opiate and most of the nostrums for the cure of the liquor habit contain some nauseating ingredients or slow emetics. The object of the latter treatment is in most cases to make the victim's stomach so sensitive that it will instantly reject anything of an irritating nature like alcohol. It will be readily conceded that such treatment is of no

* Extract from letter of the Board of Charities to the Commissioners, February 4, 1906.

real value and is likely to produce permanent injury of the stomach and digestive functions. Mr. Adams's comments in Collier's Weekly on this subject are very much to the point. "The Sunday newspapers and small weeklies teem with advertisements of drink cures which are supposed to exorcise the alcoholic craving when secretly given in the tea or coffee. Few of these concoctions can be described as immediately dangerous, though none of them is really safe. All are swindles. They do not cure the drink habit. Once in a while some drunkard will succeed in breaking his fetters synchronously with the taking of the 'remedy,' and the wonderful 'cure' is heralded to the world. But the percentage of these cures is so small as to be practically negligible. * * * Speaking of the safe rule to follow in the cure for the drug and alcohol habit, he says:

Reputable sanitariums there are in plenty for this purpose; most physicians know of them. The addict who can not be cured in them can not be cured anywhere, and might better buy his poison at the regular rate than at a fancy price from the vicious quacks of the advertising school.

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THE HARMFUL EFFECTS OF SO-CALLED ETHICAL PROPRIETARY MEDICINES, ACETANILID, ANTIPYRIN, AND PHENACETIN.

HEADACHE REMEDIES, ETC.

Before considering the nostrum evil in general, attention should be invited to Doctor Kebler's excellent unpublished article on the harmful effects of the above remedies when employed promiscuously and without medical supervision. For the purpose of this paper it is simply necessary to state that these preparations were used at one time rather extensively by physicians for the reduction of temperature in fevers and for the relief of pain, especially in neuralgia and headaches. The profession, however, soon learned that the administration of these drugs was attended quite frequently with profound symptoms of depression and other untoward effects, and this, together with a number of fatalities incident to their use, resulted in a gradual but not complete discontinuance of the drugs. In the meantime, however, the pain-relieving properties of these drugs became known to the laity, and they are extensively used in their original form for the relief of headache and other pains, or as ingredients of many advertised cures for headaches, etc.

According to Doctor Kebler, there are approximately 365 headache remedies now on the market, and the list is by no means complete; about one-half of these have so far been examined by the Bureau of Chemistry under the pure food and drugs act. (See Appendix.) Among these is the remedy known as Harper's "Curforheadake Brain Fude," which acquired recently notoriety in the local courts, and which, according to the Bureau of Chemistry, contained, among other ingredients, acetanilid and antipyrin. In regard to the ridiculous claim that such preparations act as food for the nerves or brain, the judge in the case just referred to, in his charge to the jury, said:

If that word "brain food," spelled in the two different ways that it is spelled, would convey to the ordinary citizen the idea that it was a food for the brain as contradistinguished from the idea of a food for the whole body, then it is—and I so charge you in this first prayer—misleading and therefore a violation of the law.

The Department of Agriculture has carried on a very exhaustive investigation into the poisonous properties of these drugs for the very laudable purpose of sounding a note of warning as to the injurious and even fatal effects which may follow their ill-advised, prolonged, or habitual use. The following table shows the number of instances in which poisoning, death, or habitual use has been known to result:

Total number of cases.

	Poisoning.	Death.	Habitual use.
Acetanilid	909	31	144
Antipyrin	592	15	7
Acetphenetidin (phenacetin)	164	8	18
Total	1,665	54	169

Of this total number, 852 were found in medical literature and 813 were reported by 400 of the 925 physicians to whom letters of inquiry had been directed by the department. Doctor Kebler says:

Granting that the 525 physicians who did not reply had no cases to report, the question may be profitably asked—If 925 physicians have observed 813 cases of poisoning by these drugs, 28 deaths which were attributed to their use, and 130 instances of habitual use, how many such cases have in all probability been observed by the 125,000 physicians scattered throughout the United States?

THYROID EXTRACTS IN OBESITY OR ANTIFAT CURES.

Doctor Kebler,[a] and more recently Drs. Reid Hunt and A. Seidell,[b] of the Hygienic Laboratory of the Public Health and Marine-Hospital Service, have called attention to the frequency with which thyroid preparations are being used in the antifat nostrums. As in the case of the remedies just discussed, so, with thyroid extracts, have physicians become extremely cautious in their employment. These preparations were primarily used for the cure of goitre, and, while they produced a marked reduction in the size of the tumor, it was also found that they caused a marked loss in bodily weight, amounting in some instances from 2 to 11 pounds a week, all of which naturally suggested their employment for the reduction of obesity. But the careful observer soon found that these results were not without serious risks to the general health, and practically abandoned the remedy except in some well-selected cases. The manufacturer of proprietary remedies seized, however, very promptly upon the opportunity to incorporate what must be considered dangerous remedies with other ingredients, and offered them as "Obesity Food," "Rengo Fruit," "Kellogg's Obesity Food," "Arbolum Mixture," "Marmola," with the usual assurances of being scientific and effective preparations for the reduction of fat. Since thyroid extract is characterized by Dr. Reid Hunt as "the most powerful tissue-destroying drug known," the effects upon the unfortunate victims of misplaced confidence can be imagined. The employment of these agents for this purpose is, however, of such recent date that no

[a] "Journal A. M. A.," November 10, 1906.
[b] "Journal A. M. A.," October 24, 1908.

fatalities have been reported. We know, however, that several fatal cases were reported when employed under the supervision of competent physicians, and, in November, 1906, in an editorial in the "Journal of the American Medical Association," the danger of "organotherapy" in producing arterial degeneration was pointed out, as well as the necessity of being "careful in the application of such remedies, and especially not to hand over the employment of them too freely to the public under such circumstances that they will be used over prolonged periods without proper safeguards and the careful observation of a trained medical mind."

THE NOSTRUM EVIL IN GENERAL.[6]

Our sociological study of 1,217 families in this city shows that they expended $2,032.39 per annum for patent or proprietary medicines. The annual expenditure in the United States has been estimated to be not less than $62,000,000. The far-reaching consequences of this traffic, which impoverishes the health and depletes the pocketbook of a large class of persons, has been made, in a fearless and most commendable manner, the subject of popular education, notably by the Ladies Home Journal, Collier's Weekly, the Journal of the American Medical Association, Pharmaceutical Journal, and by Prof. Harvey W. Wiley and his associate, Dr. Lyman F. Kebler, of the Bureau of Chemistry, United States Department of Agriculture.

The writer has long since taken a keen interest in the subject because as a sanitarian he felt convinced that the harmful effects of this nefarious business upon the health and general welfare of the community have never been sufficiently emphasized, even by the medical profession. The American Medical Association adopted the following principles over fifty years ago: "It is equally derogatory to professional character for physicians to hold patents for any surgical instruments or medicines; to accept rebates on prescriptions or surgical appliances; to assist unqualified persons to evade legal restrictions governing the practice of medicine, or to dispense or promote the use of secret medicines, for if such nostrums are of real efficacy, any concealment regarding them is inconsistent with beneficence and professional liberality; and if mystery alone can give them public notoriety, such craft implies either disgraceful ignorance or fraudulent avarice. It is highly reprehensible for physicians to give certificates attesting the efficacy of secret medicines or other substances used therapeutically."

No effective work in the propaganda for reform in proprietary medicines was done, however, until the creation of the Council on Pharmacy and Chemistry in the American Medical Association in February, 1905. This council has rendered, and will continue to render, most meritorious services to the cause of humanity. To show the enormity of the traffic and corresponding dangers, the following statement (the data to December 31, 1900, having been originally collected for my "Oration on State Medicine," delivered before the American Medical Association June 8, 1901), is herewith presented:

[6] The author is indebted to Dr. M. G. Motter for valuable references to the literature of the subject.

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Patents issued by the United States Patent Office.

	To Dec. 31, 1900.	From Jan. 1, 1901, to Oct. 31, 1908.
Disinfectants	321	202
Extracts	250	65
Hair dyes and tonics	48	7
Insecticides	180	64
Internal remedies	876	88
Plaster	56	19
Topical remedies	871	85
Veterinary	78	10
Total	1,980	490
Trade-marks issued:		
Drugs and chemicals	319	.....
Medical compounds	8,974	.....

Under date of November 17, 1908, the Commissioner of Patents informs me that trade-marks have been reclassified, and since January 1, 1901, there have been issued in subclass No. 6, chemicals, medicines, and pharmaceutical preparations, approximately 2,105 trade-marks. This means that up to October 31, 1908, the office has issued 2,140 patents and 8,398 trade-marks on drugs, chemicals, and medical compounds.

By the term patent medicine, as properly employed, it must be understood that the composition is known and can be seen at the Patent Office. The proprietary medicine is a secret preparation protected by a trade-mark and hence preferred by the owner, but both are vaguely termed by the public patent medicines.

The proprietary medicines are subject to the control of the state authorities and, if containing alcohol in sufficient quantity to be intoxicants, are subject to internal-revenue laws. But up to the enactment of the pure food and drugs law, June 30, 1906, nothing was done to control the sale of secret remedies and medicinal preparations containing habit-forming drugs, the composition of which need not even be disclosed to the Patent Office.

Fortunately, section 8 of the act referred to provides that an article shall be deemed to be misbranded * * * if the package fails to bear a statement on the label of the quantity or proportion of any alcohol, morphine, opium, cocaine, heroin, alpha or beta eucaine, chloroform, cannabis indica, chloral hydrate or acetanilid or any derivative or preparation of any such substances contained therein. In consequence of this very wise provision of the law we are now enabled to estimate the enormity of the harm which must inevitably result from promiscuous use of such preparations.

A most excellent report on "secret drugs, cures and foods" was presented by Special Commissioner Octavius C. Beale to the Parliament of the Commonwealth of Australia, August 8, 1907, in which he discusses the subject under six headings, viz: Prevention of conception and feticide; (2) infanticide and infantile mortality; (3) injury and death to the adolescent; (4) injury and death to adults; (5) advertisements; (6) legislation. In view of the importance of the subject, it is deemed desirable to present here a brief summary of the

most important facts collected by this painstaking investigator, not only in Australia, but also in the United States, Canada, Great Britain, Germany, and France.

PREVENTION OF CONCEPTION AND FETICIDE—REGULATION OF FAMILIES.

In this section Commissioner Beale writes:

The practice of interference with the sexual function is so common and the knowledge of it so universal that it would be thinnest hypocrisy upon the part of any grown person to pretend that modesty may be shocked at considering its causes and consequences. The disastrous effects upon men and women are set forth in plain and decent language in the report of the New South Wales royal commission upon the decline in birth rate and upon mortality of children, which it would be well to reproduce by another inquiry over a wider sphere, or indeed merely to reprint for broadest distribution. Just because deception and falsehood are widespread there is occasion to confront them by candid truth. * * * Before me is a copy of the second volume. * * * There, upon page after page, are photographs of the advertisements of obscene creatures who corrupt society at its core and live like larvæ upon their own poison and the corruption it causes. The announcements appear to-day just as before, only more of them. To debauch and degrade humanity is a profitable trade. On those pages are also photographs of numbers of preparations to prevent births, of contrivances toward obscene practices. * * * There is only one remedy—morality by act of Parliament, enforced by severe penalties. * * * No attempt will be made to give a comprehensive statement of the means adopted to induce miscarriage. The unnatural practice is assisted by the free sale of drugs, often at exorbitant prices, under proprietary names. These are openly advertised in Anglo-Saxon countries, which differ therein from one another only in degree, the names and descriptions of the drugs being well understood by dealers and users.

In order amply to elucidate the subject of criminal abortion by drugs Mr. Beale quotes the following extract from Taylor's "Medical Jurisprudence" (Vol. II, p. 166, et seq.):

The following generalization, which is strictly warranted by facts, conveys a warning to would-be abortionists, whether professional or habitual, or lay and occasional. There is no drug, and no combination of drugs, which will, when taken by the mouth, cause a healthy uterus to empty itself, unless it be given in doses sufficiently large to seriously endanger by poisoning the life of the woman who takes it.

In this country, as explained by Doctor Kebler, the publication of advertising matter inviting attention to means whereby conception can be prevented or abortion produced is specifically prohibited by law. In order to circumvent the law, however, the advertising literature is so framed as to clearly indicate the purpose for which the preparation is intended, such as "French Female Pills, a safe, certain relief for suppressed menstruation. Never known to fail. Safe, sure, speedy," etc.

Vital statistics show that the birth rate in England has dropped from 34.3 per 1,000 in 1878 to 28 per 1,000 in 1901; in South Australia from 39 in 1885 to 24 in 1906; in Germany from 40.4 in 1881 to 35.3 in 1894. The great decline in the birth rate in France has been a matter of much comment, and the latest statistcis show little or no increase in the French population. The birth rate of Paris, already low in 1881, has further declined from 23.3 to 16.6 in 1894. We have no reliable birth rates for the United States as a whole. The census statistics of 1900 show that the birth rate has increased from 26.9 in 1890 to 27.2 per 1,000 of the mean population in 1900. Harrington, in speaking of the decline in birth rates in foreign coun-

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tries, says among the descendents of the original colonists and earlier immigrants the same decline is most evident. * * * In Massachusetts the statistics of 1898 show that the greatest proportion of the number of births belongs to the foreign born, the children of native parentage on both sides representing 32.36, those of mixed parentage 19.42, and those of foreign-born parentage 48.22 per cent of the total births. The crude birth rate was 27.37.

Mr. Roosevelt is quoted to have said that "there are fewer descendants of the revolutionary forefathers living to-day than there were fifty years ago. We must either alter our ways or we must make way for the other races—Asiatic or whatever they are—that will certainly replace us." Every thoughtful physician and layman realizes that the declining birth rates are chiefly the effects of vice, unnatural interference, and actual homicide.

Dr. H. S. Pomeroy, of Boston, over twenty years ago presented the moral, social, and medical aspects of prevention in his book, "The Ethics of Marriage," which evoked the unqualified approval of the late Mr. W. E. Gladstone. The President of the United States has uttered notes of warning on the "race suicide problem," and Professor Emmet, the eminent gynecologist, asks:

> Can anyone accustomed to treating the diseases of women say in truth the statement is exaggerated that we can see on any one day more sorrow and misery resulting from the abuse of the married state than would be found in a month from uncomplicated child-bearing?

Doctor Kebler has furnished me with a list of 51 so-called female pills or regulators advertised in this country. (See appendix.) While quite a number may act as abortifacients, the majority are worthless and frauds pure and simple. Among a number of fraud orders issued by the Postmaster-General during the past two years the following transcript from the records of the Assistant Attorney-General's office, submitted May 29, 1908, in the case of Mrs. A. Kirk and the Reliable Remedy Company, 2317 Brooklyn avenue and Eighteenth and Grove streets, Kansas City, Mo., will be of interest:

> It will be remembered that on October 29, 1907, a fraud order was issued against the Doctor Price Remedy Company, its officers and agents as such, and Mrs. J. Linson and Mrs. A. Miller, 2004 Woodland avenue, Kansas City, Mo. The scheme against which the order was directed was conducted by a man by the name of Arthur P. Miller, and involved the sale through the mails, by means of advertisements in newspapers and circulars, of pills for women to act as abortifacients, which pills in fact were worthless for the purpose, as was well known to Miller. Miller was indicted November 5, 1907, in connection with the above case, and on the following day he entered a plea of guilty and was sentenced to a term of six months in the Bates County jail at Butler, Mo., and to pay the costs of prosecution.
>
> A report has now been received from the inspector at Kansas City, Mo., that Miller, as soon as the fraud order was issued October 29, moved his desk into the real estate office of a man by the name of William Abel, Eighteenth and Grove streets, Kansas City, Mo., where the two continued the business until Miller pleaded guilty, and that during the time he was serving the sentence his wife conducted the business for him with Abel. * * * In order to receive the mail, these parties advertised under the fictitious names of Mrs. A. Kirk, 2317 Brooklyn avenue, which is the residence of Abel and Miller, and to those persons who replied to their advertisements they sent circulars under the name of Reliable Remedy Company, Eighteenth and Grove streets, which was the office of Abel, in which circulars the addressee was solicited to remit $2 for pills, which were described in language calculated to cause the reader to believe they would act as abortifacients. * * * The inspector says that about 25 letters are being received daily by those persons in connection with the scheme.

The inspector states that he presented the above facts to the United States attorney, who caused the matter to be presented to the grand jury, which returned an indictment against both Miller and Abel on May 5, to which indictments these parties have entered a plea of not guilty and gave bond of $1,000 each to stand trial. * * * Fraud order issued May 29, 1908. Abel was sentenced September, 1908, to pay $25 and costs.

INFANTICIDE BY SYSTEMATIC DRUGGING OF CHILDREN.

In discussing the subject of infant mortality in relation to the occupation of women, the influence of ignorance and poverty has been emphasized, and we quoted Sir John Simon, on page 78,[a] to the effect that "infants who should be at the breast are improperly fed or starved, or have their cries of hunger and distress quieted by those various fatal opiates which are in such request at the centers of our manufacturing industry." We have also referred to the injury done by abnormal cow's milk and the injurious quality of certain proprietary and other artificial foods. But when we contemplate the frightful mortality in illegitimate children, and of the stillbirths, especially in illegitimate offsprings, we may well apprehend that this extraordinary destruction of life is induced not only by ignorance or poverty, but also by crime.

Of the 66,808 births in Washington from 1879–95, 37,781 were white and 29,127 colored, with 1,136 illegitimate births in the white race and 6,706 in the colored element. Of the 7,249 stillbirths in this city during the same period 2,750 were white and 4,449 were colored; of this number 2,053 were illegitimate, 307 or 15.1 per cent were white and 1,746 or 84.9 per cent were colored.

In this connection it is desirable to point out the serious consequences of the systematic drugging of children by "soothing syrups," "teething syrups," "children's comfort," "The infant's friend," etc. Doctor Kebler has furnished me with a list of six such compounds, all containing opium or morphine, not to mention the numerous cough and croup remedies in the market. Nearly every one is familiar with "Mrs. Winslow's soothing syrup;" it contains morphine; so does "Doctor Fahrney's teething syrup," for, according to Doctor Kebler, the label declares each ounce contains alcohol, 9 per cent; morphine, one-seventh grain; chloroform, two-thirds of a minim; combined with seven other articles. "For babes. A sure remedy for all ailments incident to babes from 1 day old to 2 or 3 years; * * * contains nothing injurious to the youngest babe and if given in proper dose will always relieve." Elsewhere upon the label occurs the following statement: "Mothers need not fear giving this medicine to the youngest babe, as no bad results come from the continued use of it. Many children have taken 2 and 3 dozen bottles and to-day are hale and hearty boys and girls." This language shows on the face of it that the manufacturer knows full well that the drug is dangerous. It should be known that children are especially susceptible to the toxic effects of opium and its preparations. In December, 1905, a coroner's jury in Baltimore warned the public not to use "Kopp's baby friend," on account of the death of a white infant, aged 3 months and 14 days, who had been given this preparation by his mother while suffering from indigestion. The evidence at

[a] Kober's Industrial Hygiene.

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the inquest, according to the district attorney, showed that not only this child, but probably three others in the neighborhood, had died recently from the use of patent medicines administered to them. The Journal of the American Medical Association, February 9, 1907, reports the death of twin children 6 weeks old in New Castle, Pa., caused, according to Doctors Cooper and Warner, by "Kopp's baby friend." The parents gave it according to the directions accompanying the bottle—6 drops every two or three hours to keep the infant from crying. The children were not sick; they lived about one day after beginning to take the medicine. When Doctor Warner, the attending physician, saw them, they were in the last stage of opium poisoning. They had not been given any other medicine. In the same issue of the Journal are the reports of the death of a child aged 10 months from "Mrs. Winslow's soothing syrup," another death in a child from the effects of "Monell's teething syrup," and still another from the effects of "Rex cough syrup." Space will not permit the presentation of other cases or to point out the extreme danger which lurks in many of the cough, colic, and diarrhea mixtures and other proprietary remedies which have killed children and adults and yet are unblushingly advertised as safe and harmless for babes.

Every one at all familiar with the subject knows how frequently nurses have to be discharged for "doping" infants, and the fact that 44 children under 5 years of age have perished in this city during the last 10 years from accidental poisoning is sufficient indication of the dangers attending the promiscuous use of poisonous drugs.

DIPHTHERIA CURES.

Doctor Kebler has furnished a list of 10 advertised diphtheria cures. In view of the fact that diphtheria antitoxin is the only reliable remedy in this disease there can be no question that recourse to advertised cures is fraught with danger to the child. The death rate from diphtheria and croup in 1890 was 97.7 per 100,000; in 1900 it was only 45.2, a decrease of 52.5 per cent. This splendid gain is almost entirely due to the use of antitoxin. The average diphtheria mortality where antitoxin was used in 1902 was 6.48 per cent and where not used it was 32.5 per cent. The earlier the antitoxin is employed the lower are the death rates. The mortality in children when used upon the first day was 1.45 per cent, but when used later than the fourth day it rose to 14.49 per cent.

ADVERTISED DIPHTHERIA CURES.

Hesperian Tonic, Dr. J. W. Roberts. Cure for Diphtheria, etc.
Humbug Oil. Cures Diphtheria.
Colwell's Egyptian Oil. Dr. Colwell's Magic Egyptian Oil, cures diphtheria, etc.
Hamlin's Wizard Oil. Cures rheumatism, diphtheria, etc.
Dr. Winchell's Teething Syrup. A certain preventive of diphtheria.
Wizard Oil.
Dr. Shoop's Diphtheria Remedy. For the relief and cure of diphtheria.
Gar-Gol. An absolute specific * * * for all kinds of sore throat. Preventive of diphtheria.
Indian Rattle Snake Oil. We guarantee a cure for * * * diphtheria and catarrh.
Vapo-Cresoline. "Cures while you sleep" whooping cough, * * * diphtheria, catarrh.

INJURY AND DEATH TO THE ADOLESCENT.

In this section Mr. Beale considers the exposure of the young to demoralization and even to debauchery by (*a*) the sale of intoxicants known as "bracers," which are disguised alcoholics; (*b*) by preparations of cocaine, of acetanilid, of sulfonal, and other synthetic depressants, of opium (to a much less extent); (*c*) by compounded drugs supposed to excite sexual desire; (*d*) by preparations intended to prevent conception or to induce abortion; and, finally, (*e*) by the sale of certain things manufactured in Europe which are designed and sold for the sole purpose of nameless and unnatural vices.

The subject of "bracers" has already been discussed in connection with the alcohol habit. Those desiring additional information as to their general composition and effects, not infrequently seen in innocent women and clergymen, can do so by consulting the pages of "Collier's Weekly" for October, 1905, or Mr. Beale's report, pages 90–94. Dr. J. D. Morgan informs me of a recent case of alcoholic multiple neuritis in a most estimable lady who had taken Peruna as a tonic.

We have already discussed the cocaine and drug habit and the shameful traffic in lost-manhood restorers.

It is impossible, in the scope of this article, to give an adequate conception of the enormity of the nostrum evil. Some idea may be formed by a perusal of the 431 pages of Mr. Beale's report and an inspection of the storerooms of the Division of Drugs of the Bureau of Chemistry, United States Department of Agriculture, where thousands of preparations may be found, not one-tenth of which have been analyzed for lack of laboratory force. And yet the end is not in sight, but the supply is increased, as will be seen by reference to the statistics of the Patent Office, p. 263, at the rate of about 200 a year. "A most able and veracious physician has truly asserted that quackery has destroyed more in this country (Great Britain) than the sword, famine, and pestilence united, and never was there a period in the history of British medicine at which the force and truth of this opinion was more obvious than at this day." (Cited by Beale from the "Lancet," London, June, 1906, p. 1886.) The Standard Dictionary defines a quack as a pretender and quotes the following:

> South Sermons, Volume II, Sermon XXX, page 133: "Quacks and mountebanks are doubtless a very dangerous sort of men—they are both of them always very large in pretense and promise, but short in performance and generally fatal in their practice."

Dr. M. A. Clark, in a recent article on quacks,[a] quotes Steele in his "Spectator" of July, 1712, as saying:

> Quack doctors who publish their great abilities in little green billets, distributed to all who pass by, are to a man impostors and murderers. I doubt not but that the editors of our great newspapers of to-day would voice the same sentiment, and yet we find these journals full of advertisements of quacks and quack medicines.

CONSUMPTION CURES.

Doctor Kebler has furnished me with a list of 35 remedies advertised for the prevention and cure of consumption. Many of these preparations contain drugs which enslave, but the chief transgression

[a] Atlanta Journal Record of Medicine, October, 1908.

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lies not as much in their composition "as in the fraudulent methods used in their exploitation, such as symptom blanks and mystic and misleading statements and false claims made in the advertising literature." The medical profession knows that there is no specific remedy for the disease in any of its stages. It is also well known that no germicide, whether taken internally or inhaled, which would kill the tubercle bacilli, could be administered without serious danger to the patient. It is also well known that good food, pure air, and a rational hygienic regimen offer the best chances for recovery, and that patients who resort to all sorts of quack remedies in the early stages of the disease deprive themselves of the most favorable opportunity for a permanent cure. It is true the excuse given by many is inability to pay a doctor or druggist, but, as a matter of fact, no person belonging to the dependent classes need ever go without the most skilled medical care and treatment in connection with our dispensaries and hospitals. I have never known a reputable physician to decline to lend a helping hand in directing such patients into the proper channels. One of the interesting features in connection with the alleged consumption cures is that special attention is given to the dietetic and hygienic regimen, which is, after all, the fundamental basis of success and can be had free as a matter of public education. Among the remedies extensively advertised is "Tuberculozyne," which is claimed as having killed the consumption germs, and that all trace of the disease in blood and tissue was destroyed." Doctor Kebler might have added "Liquozone," which in addition to consumption is alleged to be a cure for 36 other diseases from asthma down to tumors and ulcers.

Doctor Kebler's list of remedies advertised for the prevention or cure of consumption is as follows:

Acker's English Remedy. (?)
Allen's Lung Balsam. (?)
Ayer's Cherry Pectoral.
Ballard's Horehound Syrup.
Birch Mountain Tea.
Dr. Bull's Cough Syrup.
Chamberlain's Cough Remedy.
H and N Consumption Cure.
Hickory Bark Cough Remedy.
Hoff's Consumption Cure.
Dr. King's New Discovery.
Lung-Germine.
Mrs. Wesley Magg's Consumption Cure.
Mizpah Cure.
Peruna.
Phoric Electric Method.
Piso's Cure.
Richardson's E Z Lung Tonic.
Roger's Compound Syrup of Liverwort, Tar and Cumalinagua.
Severas Lung Balsam. (?)
Eckman's Alterative.
Elebert's Cold and Consumption Cure.
Father John's Medicine.
Foley's Honey and Tar.
Fourneir's Throat and Lung Remedy.
Germicidal Vapor Inhalation Treatment. Dr. Anderson.
Shiloh's Consumption Cure.
Dr. Stevens' East India Consumption Cure.
Tuberculoids.
Vanderpool's Consumption Cure.
Victor's Lung Syrup. (?)
Vinol.
Virgin Oil of Pine. Leach Chemical Co.
Wilson's Preparation of Hypophosphites and Blodgetti.
Yonkerman Consumption Cure, "Tuberculozyne."

ASTHMA AND HAY FEVER CURES.

The following is Doctor Kebler's account of this class of secret remedies:

These nostrums are usually sold over the counter. A few of them, however, can only be obtained from the producer direct. As an example of the latter class may be mentioned Tucker's Asthma Specific. This preparation, which is widely advertised throughout the country and enjoys a large sale, consists of

a small bottle of medicine and a spray atomizer. The price of the "treatment" is $12.50. Analysis of a sample of the medicine disclosed the presence of cocaine. The remedy should therefore be a good "repeater." Additional supplies of the inhalant can be obtained from the producer upon payment of $1 per ounce. Some asthma cures are sold by the producer only after preliminary correspondence and the use of "symptom blanks," as in case of cancer cures. Hayes' Asthma Cure belongs to this class.

The remedies themselves may in general be divided into three classes: Medicines intended to be taken internally, medicines intended to be taken by inhalation, and medicines intended to be burned and inhaled. The preparation known as Davis' Liquid Asthma Remedy is an interesting example of remedies belonging to first of these classes. According to the statement which appears upon the label, the product contains over five grains of chloral hydrate to the dose. The directions state that it should be taken "one tablespoonful twenty minutes after meals, at bedtime, and on arising in the morning." "Adults can repeat dose every two hours." "Dose can be increased or diminished, or taken oftener if needed." The statement also appears that it "keeps you from having asthma." The danger of the formation of the chloral habit through the use of such a preparation is apparent.

Following is a list of remedies belonging to the general class of asthma cures:

Himalaya Asthma Cure.
Hart's Swedish Asthma and Hay Fever Cure.
Haylene Cure.
Dr. Olin's Asthma Cure.
Dr. R. Schiffmann's German Asthma Cure.
Green Mountain Asthma Cure.
Papham Asthma Specific.
Dr. Olin's Hay Fever Cure.
Dr. J. R. Stafford's Olive Tar.
Himrod's Asthma Cure.
Milk Emulsion.
Tucker's Asthma Specific.
Brater's Asthma Cure.
Dr. B. W. Hair's Asthma Cure.
Bryan's Imperial Asthma Cure.
Taft's Asthma Cure.
Ballard's Horehound Syrup.
Japanese Oil.
Severa's Lung Balsam.
Davis' Liquid Asthma Remedy.
Davis' Asthma Powder.
Warner's Safe Asthma Cure.
Asthma Cure.
Birch Mountain Tea.
Chilean Asthma Cure.
Frontier Asthma Cure.
Hayes' Asthma Cure.
Upham's Asthma Cure.
Ascaco.
Asthma Cure. Frank Wetzel, M. D.
William's Asthma Cure.
Renacol.

CATARRH CURES.

According to Doctor Kebler:

Nostrums belonging to this class are usually intended for local application to the nose or throat and are generally prepared in the form of powder (or "snuff"), ointment (or 'jelly'"), or in stick form for inhalation. In addition, there are liquids intended for use as spray or douche. When the "cure" rises to the dignity of a "treatment," a "constitutional" or "blood" medicine is usually added, as in case of "Gauss' Combined Treatment," "Dr. T. F. William's Treatment," etc. The catarrh jellies, catarrh powders, and catarrh cures generally are usually sold over the counter, but the "treatments" are furnished upon application to the advertiser direct. The initial advertisement generally contains an offer of free trial treatment or a free book upon the subject of catarrh, in return for the reader's name and address. Accompanying the book or the trial treatment are numerous testimonials and other advertising literature intended to interest the correspondent and secure a sale of the remedy. It is possible that some of these preparations do good in chronic nasal catarrh in a palliative way through a cleansing or antiseptic effort, but none of them can possibly make good the extravagant claims made for them with regard to the cure of the disease.

A list of preparations belonging to the general class of "catarrh cures" is given below:

Bunsen's Catarrh Cure.
Crown Catarrh Powder.
Catarrh Powder, Britt, Loeffler & Weil, New York.
Tousley's Sneezeless Snuff.
Dr. A. W. Chase's Catarrh Powder.
Dr. Olin's Catarrh Cure.
Catarrh Balm.
Sanford's Radical Cure for Catarrh.
Century Catarrh Cure.
Pond's Extract Catarrh Cure.
I. C. R. Instant Catarrh Relief.
Ely's Liquid Cream Balm.
Dr. Agnew's Catarrh Powder.
Allan's Catarrh Cream.
Biel's Catarrh Jelly.
Dr. Slack's Mexican Ointment.
Milk's Catarrh Cure.
Kondon's Catarrhal Jelly.
Cole's Catarrh Cure.
Dr. Birney's Catarrhal Powder.
Thymo Catarrh Balm.
Premuim Prescription.
Bear's Catarrh Remedy.
Dr. Evory's Diamond Catarrh Remedy.
London Catarrh Cure. London Balm.
Hering's Vegetable Specific Catarrh Cure.
Old Saul's Catarrh Cure.
Hall's Catarrh Cure.
Gauss' Combined Catarrh Cure.
Century Catarrh Cure.
Ozojell.
Nosena.
Pollantin Powder for Catarrh.
Paracamph.
Dr. Syke's Sure Cure for Catarrh.
Ka-ton-ka.
Branaman's Catarrh Cure.
McCode Catarrh Cure.
Sproule's Catarrh Cure.
Botonic Blood Balm. B.B.B.
Mederine.
Grove's New Discovery for Catarrh.
Dr. Shoop's Catarrh Remedy.
Mucu-Tone.
California Mineral Crystals.
Hyomei.
Davis' Oil.
Dr. Blosser's Catarrh Cure.
Catarrh Cure. Dr. W. O. Coffee.
Microcide.
Dr. W. H. Long's Great Mountain Moss Catarrh Jelly.
Adlyne Catarrh Treatment.
Blackburn's Victory Catarrh Tablets.

SKIN CURES.

Doctor Kebler divides nostrums advertised for this purpose into two classes: First, those which are claimed to cure skin diseases, like eczema, parasitic skin affections, etc.; and, second, the products which are claimed to be efficacious in the prevention and cure of less serious skin affections, such as erythema, pimples, and blackheads. They are advertised to prevent and remove wrinkles from the faces of persons of any age; to impart youthful properties to the skin, making it "clear, soft, and velvety;" and to remove completely and permanently all facial blemishes, pimples, blackheads, freckles, tan, sunburn, sallowness, etc. It is claimed in most cases that they accomplish these results through a nourishing effect upon the skin, "feeding the skin through and through." For this reason they are often called "skin foods." They are analogous to "nerve foods," "brain foods," etc. With regard to this use of the word "food" in connection with the names of medicinal preparations, it may be well to recall the charge to the jury in the recent case of the United States *v.* R. N. Harper (see p. 260).

Following is a list of the remedies belonging to the general class of skin cures:

Med-Aseptic Cold Cream Skin Food.
Riker's Violet Cerate Skin Food.
Hudnutine Toilet Cerate (Skin Food).
Marvelous Cold Cream Skin Food.
Excelsior Skin Food.
Kingsbury's Velvet Skin Food.
De Meridor Granulus Cold Cream Skin Food.
Acme Tablets. Dermol.
Cuticura Soap.
Cuticura Ointment.
Cuticura Resolvent.
W. W. W. Wood's Ointment.
Pompeian Massage Cream and Skin Food.
D. D. D. Remedy for eczema, etc.
Sartoin Skin Food.
Epp-O-Tone Skin Food.
Cre-Mo-Jel.
Wisdom's Rubertim (Skin Food).
Poslam.
Palmer's Vegetable Cosmetic Lotion.
Zema-Cura.
Dr. Agnew's Ointment.
Perfect Cold Cream Skin Food.
Satin Skin Cream and Skin Food.
Red Cross Skin Food.
C. C. C. Eczema Cure.
Dr. Campbell's Arsenic Complexion Wafers.
Crane's Eczema Cure.
Para-camph.
Rexall. Cream of Almonds.
Sempre Glovine. Skin Food.
Laird's Bloom of Youth.
Mme. Hayden's Skin Food.
Parisian Electro Skin Food.
Kintho Beauty Cream.
Aughinbaugh's Cold Cream. Skin Food.
Eureka Complexion Tablets.
Nadinola.
Gourand's Oriental Cream.
Lait Antiphenique.

RHEUMATISM CURES.

The following is an extract from Doctor Kebler's article on nostrums and fraudulent methods of exploitation:[a]

MAGIC FOOT DRAFTS.

The following are quotations from the literature:

"Magic Foot Drafts are known all over the world as the safest, surest, and simplest cure for all kinds of rheumatism. They cure when everything else fails. Best of all, they cure to stay cured. * * * If 100,000 people from every State and Kingdom of the earth have been cured of rheumatism, of every kind and from whatever cause, by Magic Foot Drafts, can any prejudice exist in your mind to prevent your giving the remedy a fair trial?"

No one reading these quotations can arrive at any other conclusion but that "Magic Foot Drafts" are capable of curing all forms of rheumatism. "Magic Foot Drafts" consist of pieces of oil cloth, covered on the unfinished side with a border of adhesive mixture, and the central portion with a plaster composed of the following:

	Per cent.
Poke root	30
Pine tar	62
Corn meal	8

These drafts are to be applied to the hollow of the soles of the feet and are claimed to effect cures in the following manner:

"By cutaneous absorption curative elements are taken from the draft. These are carried to the blood by the lymphatics, and neutralize the poisons. * * * It (Magic Foot Draft) stimulates the nerves to activity. The nerves in turn act on the muscles, veins and arteries, increasing the circulation of the blood, compelling it to hasten and deliver up its poisons from the whole system to the sweat glands just beneath the skin, and from thence it is drawn by the draft through the pores and absorbed. Thus is effected a cure, no matter where the pain is located, because all the blood of the body passed through the capillaries."

There is nothing whatever in these drafts to warrant such claims and representations. They possess no curative element whatever which when absorbed into the blood will neutralize the poisons which are supposed to be the cause of the rheumatism and in this manner effect a cure.

[a] Journal Am. Med. Association, Novbr. 10 and 17, 1906.

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A particularly interesting feature connected with this scheme is that the promoters when asked for reasons for their claims drew on the writings of the best authors of the country, such as the late J. M. Da Costa, Dr. H. C. Wood, Dr. J. V. Shoemaker, Dr. H. A. Hare, the medical author of the "American Dispensary," and others. These authors, when informed relative to the use made of their writings, vigorously protested, claiming that any interpretation of their writings which would in any way bolster up the scheme of the "Magic Foot Draft" was absolutely unjustifiable.

The following lists have been supplied by Doctor Kebler:

RHEUMATISM CURES.

Kennedy's East Indian Bitters.
Nature's Oil.
Kelly's Rheumatic Syrup.
Warner's Safe Rheumatism Cure.
T. Rheumatic Cure. The Great Blood Purifier.
Athlophorus.
Griffith's Compound Mixture of Guaiac, etc.
Dr. Olin's Rheumatic Cure.
Dr. MacDonald's Atlas Compound. Specific No. 18.
Fulton's Renal Compound.
Silolyne.
R. R. R. Radway's Ready Relief.
Dr. Shoop's Rheumatic Remedy.
Wright's Instant Relief.
Japanese Oil.
St. Jacob's Oil.
Mysterious Pain Cure.
Hamlin's Wizard Oil.
Denver Mud.
Albert's Remedy. Cure for Rheumatism, etc.
Anchor Pain Dispeller. Toxol.
Rexall Rheumatic Cure.
Dr. Slack's Mexican Ointment.
Dr. McConkey's Vigor of Life.
Bogle's Quaker Balm.
Celestial Oil.
Dr. Radcliffe's Great Remedy Seven Seals.
Dr. Kilmer's W. O. Ointment.
Fenner's Kidney and Backache Cure.
Pain Balm.
White's Wonder Worker Herbs.
A. D. S. Rheumatism Cure.
Griswold's X-ray Pain Killer.
Dr. Bell's Anti Pain.
Schrage's Rheumatic Cure.
Wood's Rheumatic Cure.
Ka-Ton-Ka.
Reagan's Positive Cure for Rheumatism and Asthma.
The Wonderful Wintergreen. Great Rheumatic Cure.
Rheumetts. Etts' warranted cure for rheumatism.
Bi-Lo-Zone.
Volta Powder.
Quinine Whisky.
Lane's Rheumatic Cure.

KIDNEY AND BLADDER CURES.

Dr. Gossom's Kidney and Bladder Cure. A specific for Bright's Disease.
Bick's Laxative Kidney and Liver Tablets. Cures Kidney and Liver troubles in all its forms.
Bick's Kidney Pills.
Brown's Compound Concentrated Fluid Extract of Buchu.
Zoeller's Kidney Remedy. (Formerly Black Gin.)
National Kidney and Liver Cure.
Jay Newny's Kidney and Liver Remedy.
McBurney's Kidney, Bladder and Rheumatism Cure.
Welch's Aegopodium.
Mother Gray's Australian Leaf.
Dr. Olin's Kidney Cure.
O. K. Specific.
Dr. Maid's Celebrated Liver and Kidney Tablets.
Dr. Kilmer's Swamp Root.
Dr. Swan's Celebrated Liver and Kidney Cure.
Chewalla.
Dr. Hobb's Asparagus Kidney Pills.
Dr. Bell's Kidney Pills.
Warner's Safe Kidney and Liver Cure.
Alma-Bromo.
Warner's Safe Diabetes Cure.
Palmetto Berry Wine with Asparagus Wine.
A Texas Wonder. Hall's Great Discovery. Removes Gravel.
Marsh Root. Kidney and Liver Cure.
Rexall Kidney Cure.
Crane's Kidney and Bachache Cure.
Begg's Blood Purifier.
Allan's Kidney and Liver Cure.
Dodd's Kidney Pills.
Our Own Kidney and Liver Cure. Certain Cure of Bright's Disease.
Kidneyetts. Etts warranted cure for kidneys and all urinary diseases.
Bouvier's Buchu Gin for the kidneys and bladder.
Dr. Hubbard's Kidney and Bladder Capsules.
Doan's Backache Kidney Pills.
Var's American Kidney Pills.
Fitch's Kidney and Liver Cooler.
Munyon's Kidney Cure.

CANCER CURES.

The following is Doctor Kebler's account of the method employed by the sure-cure school in incurable diseases. Additional information on this subject will be found in "Collier's Weekly," July 14, 1906:

The initial step in the sale of these nostrums is usually the publication in the newspapers of an advertisement inviting attention to a certain and speedy cure for cancer. Following is an illustration: "I have proven cancer can be cured at home; no pain; no plaster; no knife. I have discovered a new and seemingly unfailing remedy for the deadly cancer. I have made most astonishing cures. I believe every person with cancer should know of this marvelous medicine and its wonderful cures, and I will be glad to give full information free to all who write me and tell me about their case." Those who seek further information in response to such advertisements receive in reply a stock written letter, shrewdly devised so as to give the impression that the communication is a personal one. Accompanying this is a "symptom blank," which the prospective purchaser is requested to fill out, and printed matter, including numerous testimonials, all setting forth the claim that the remedy in question is a certain, speedy, and painless cure for cancer. If there is delay in ordering the remedy, the inquirer becomes the recipient of letter after letter in which the attempt is made in every conceivable way to cajole him into purchasing the "cure." The cost of the treatment is from $15 to $25 per month, some concerns charging more than others. The sufferer is therefore obliged at the outset to part with a considerable sum of money before he receives the first supply of "treatment." The result is invariably keen disappointment on the part of the victim. The "treatment" consists of tonic and alterative remedies for internal use and simple applications for use upon the skin. They are indeed painless in most cases and are utterly worthless so far as the permanent eradication of cancer is concerned. Following is a list of concerns engaged in the sale of remedies which are claimed to cure cancer:

Dr. Bye, Kansas City, Mo.
Dr. Curry Cancer Cure, Lebanon, Ohio.
C. Gee Wo Chinese Medicine Co., Portland, Oreg.
Indian Black Vegetable Salve & Remedies Co., Brooklyn, N. Y.
Dr. Johnson Remedy Co., Kansas City, Mo.
Dr. L. T. Leach, Indianapolis, Ind.
Mason Cancer Institute, 1700-8 Broadway, New York.
Dr. Mixer, Hastings, Mich.
D. Needham's Sons, Chicago, Ill.
Radio-Sulpho Co., Denver, Colo.
E. E. Sonanstine, M. D., Colorado Springs, Colo.
Dr. Rupert Wells, St. Louis, Mo.
C. Henry Wilson, M. D., Brooklyn, N. Y.

EPILEPSY CURES.

The methods employed by individuals, institutes, or firms who prey upon this unfortunate class of patients are manifold and can best be judged by an extract of a brief submitted by Assistant Attorney-General Goodwin to the Postmaster-General, dated July 23, 1908, and which is as follows:

In re The Epileptic Institute Company and the Epileptic Institute and their officers and agents as such at Cincinnati, Ohio, and Dr. H. J. Luecke at P. O. Box No. 90, Cincinnati, Ohio.

On June 6 last this concern was cited to show cause why a fraud order should not be issued against it. * * * The facts of this matter as I find them to be are substantially as follows: This business consists of a medical treatment by mail of the disease of epilepsy. One Otto Kalmus, a resident of Cincinnati, commenced the business in the spring of 1903 under the name of Epileptic Institute, and so continued until July, 1907, when he incorporated it under the name of "The Epileptic Institute Company," he continuing as president and general manager and principal owner. As a private address for patients, who, it was explained, might not care to have it known that they were corresponding with an epileptic institute, use has been made of the name of Dr. H. J. Luecke,

a physician connected, until recently, with the institute. While not with the institute since last November, Mr. Pyle and Doctor Schoenling explained at the hearing that by agreement with Doctor Luecke his name has continued to be used and that the institute receives that mail addressed to him, which is also directed to box No. 99, in the Cincinnati post-office.

Until lately communication with epileptics was obtained through advertisements in newspapers, chiefly those circulated among Germans and other foreigners. * * *

More recently the practice has obtained of purchasing the names and addresses of epileptics from, as the inspector says, "other concerns" that have obtained all of the money possible from such unfortunates without effecting a cure and then mailing circulars to such persons, urging them to take treatment from the institute. * * * The samples of these circulars are among the papers. They are filled with highly colored and extravagant representations with reference to the unprecedented success of the institute treatment, which it denominates the "Schonka" treatment as a cure for epilepsy; and among other things, it is represented that this treatment is original with the institute and by its means the institute can successfully treat the heretofore considered incurable disease epilepsy, and in many cases effect a cure; that the treatment is something not known to medical science and is different from anything used by the profession in such cases; that the physicians of the institute are skilled and experienced specialists and include "one of the foremost examining specialists in America, etc."

The time that this institute urges its patients to continue the treatment is from a year to a year and a half, and longer, varying, of course, in different cases. Its charge for medicine ranges from about $3 to $9 a month, the variance depending, it seems, upon the amount which the patient can be induced to pay.

Here follow 10 pages of evidence. The report, on page 13, states:

The medical treatment so glowingly advertised by this institute as a "cure" for epilepsy is based on the bromides. It is what in general is known as the bromide treatment. Except, and this is where the institute tests its claims for unusual and peculiar efficacy, that the drug adonis vernalis is used in conjunction with the bromides. In connection with the medical treatment the usual and ordinary rules regarding diet, hygiene, etc., are also given. Dr. L. F. Kebler, Chief of Drug Laboratory Bureau of Chemistry, United States Department of Agriculture, informed the Assistant Attorney-General "that what is in general known as the bromide treatment is in common use by the profession in treating epilepsy; that its physiological action has been quite well defined; that it is not a 'cure' for the disease, but acts simply as a sedative, and in this way tends to suppress the attacks; that medical science to-day has no drug treatment that will cure this disease; that the disease is among the most difficult and intractable of all diseases to treat, and that a small per cent of the more favorable cases only have been successfully treated, and that the success in these instances has been due most probably to the condition of the patient himself rather than to the medication." Doctor Kebler has also drawn my attention to the following recognized medical authorities, who speak of the use of bromides in treating this disease, and more especially of evil effects that may follow their long continued use.

Here follow quotations from well-known medical authors, strongly opposed to the promiscuous and indiscriminate use of the bromides by epileptics. Of these the opinion of Dr. Wm. T. Sprattling, an authority on this disease and medical superintendent of the Craig Colony for Epileptics at Sonyea, N. Y., a state institution of recognized merit, speaking of the evils that may attend the bromide treatment, on page 364, says:

If pushed too far, death may supervene from acute bromide poisoning. This happened in the case of a boy of 12 years whom I knew, whose parents gave him too frequent doses of a patent nostrum, the essential ingredient of which, as with the bulk of patent epileptic cures, was bromide of potassium.

All of the other citations from medical authorities are of similar import. The testimony also shows that in the opinion of such eminent physicians as Drs. J. H. Musser, Richard C. Cabot, N. S. Davis,

E. L. Hunt, Charles G. Stocton, Wm. P. Spratling, and Chas. S. Williamson, it is impossible to make a reliable diagnosis of epilepsy in the absence of the patient by the use of what are known as "symptom blanks" sent through the mails. The evidence further shows that, in the opinion of these physicians, the promiscuous and indiscriminate use of the bromide by epileptics, without the guidance of a physician other than advice sent by mail, is attended by danger to the patient. As to the merits of adonis vernalis, the other drug used by the concern, six of the physicians knew of no instance in which the cure of epilepsy could be attributed to the use of this drug. Dr. Wm. P. Spratling's answer is qualified as follows:

> No; not that drug alone. The proper treatment of all the epilepsies—there are many kinds—can only be carried out under the following essential heads: Medical, general, dietetic, and surgical. Epilepsy of any type can no more be properly treated by the use of drugs alone than can tuberculosis be treated by drugs alone. A combination of the essentials is called for in each case—and it is the scientific application of these that alone can produce the best results.

The evidence discloses the fact that "there have been connected with this institute since it commenced business in the spring of 1903, three physicians, namely, Dr. E. H. Schoenling, Dr. H. J. Luecke, and Dr. A. L. Guertin. Dr. Schoenling stated at the hearing that for about the first six months, being half owner for the first three months, he attended to the medical end of the business for Mr. Kalmus, examining the symptom blanks and diagnosing the cases, prescribing the treatment, and compounding it as well; that after he left Doctor Luecke did this work until December, 1907; and that since then he has again done the diagnosing and prescribing, and Doctor Guertin has done the compounding. Doctor Schoenling graduated in 1900, when about 22 years of age, has made no special study of epilepsy except in connection with this mail-order business, is not a member of any medical society, is not regarded in the profession as a specialist, and has most of the time since his graduation worked for $25 a week for a Dr. Charles Shafer, of Cincinnati, who advertises in the public prints, soliciting kidney and urinary and sexual cases. The salary paid him for his work at the institute, he says, has been less than $100 a month; he stated that he spent but a few hours each day at the institute and regarded it as a sort of side line to his regular work with Doctor Shafer.

Doctor Luecke graduated in 1901, went to this institute in 1903, has had no special preparation in epilepsy, does not consider himself a specialist, and was paid by the institute, the inspector says, only $15 a month. He is not a member of any medical society, his professional standing is doubtful, his regular practice is sexual and urinary diseases, and in December last his advertisements were excluded from the Cincinnati papers on the ground that they related to the sale of abortifacients and the performing of criminal operations in violation of the statutes of the United States. Doctor Guertin receives $35 a month from the institute for his services, works there but a few hours each day, is not a member of any medical society, his standing in the profession is questionable, he has little or no practice in Cincinnati, and was investigated by this department in 1905 for giving a concern against which was pending a charge of fraud under these statutes, and against which a fraud order was later issued, a testimonial as to its medicine, which he later admitted to the department was done for

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a valuable consideration and without reading the statement which he was paid to sign, and which he repudiated as untrue. He admits he is not a specialist.

These are the self-styled specialists, and "foremost examining specialists of America" of this institute. No comment is needed on these facts to show the utter falsity and fraudulency of the representations in question."

The brief, which covers 32 pages, also discloses the fact that this institute has treated in all about 6,000 persons, and concludes as follows:

The physicians of the institute were not specialists as pretended, nor did the staff of the institute include the foremost examining specialists of America, but in truth the physicians of the institute were young graduates and men without standing in their profession and following questionable lines of practice, and were men employed at what would seem to be about as small salaries as any at which the required service could be obtained; and the treatment intended to be administered was not entirely harmless, but was of a nature that might wreck the health and even reason and life themselves of the patient. Therefore, while, in what may be said to be a comparatively few instances—as the institute has not disclosed its records in the great number of its cases—patients have experienced from the treatment what is the ordinary effect of the bromides and may feel satisfied with so much, yet I feel it is not true that the other and the greater share of the patrons of the institute have not been deliberately deluded with false hopes and representations, and defrauded of the money which they probably would not have paid if aware of the facts, in addition to having their health, reason, and life endangered.

The answer to the claim that certain of the patrons are satisfied with what benefit they do get from the treatment, is that in that event, were the business conducted with an honest purpose, there should be no occasion for promising any more.

The satisfaction of the few is not justification for the defrauding of the many. Furthermore, this scarcely is a case in which the patients are sufficiently familiar with the facts to be able to determine whether they should be satisfied or not, and this is especially so of the patient who has commenced the treatment but comparatively recently, and particularly among the class of people among whom it appears the most of the business of the institute is solicited.

I find that the business conducted by Otto Kalmus under the name of the Epileptic Institute and the Epileptic Institute Company at Cincinnati, Ohio, referred to above, is a scheme for obtaining money through the mails by means of false and fraudulent pretenses, representations, and promises, and I therefore recommend the issue of a fraud order. The United States attorney at Cincinnati has caused criminal proceedings to be instituted against Mr. Kalmus for having devised and used the mails in the operation of a scheme to defraud in violation of section 5084, Revised Statutes, in connection with this Epileptic Institute business.

A fraud order was issued July 23, 1908.

THE MIRACLE WORKERS.

Mr. Samuel Hopkins Adams, in Collier's Weekly, August 4, 1906, gives an excellent account of several magnetic quacks, radio-quackery, etc. The following memorandum is copied from the records of the Assistant Attorney-General's Office in the case of Prof. T. A. Mann, Institute of Radiopathy and Central School of Psychology, and their officers and agents as such at Rochester, N. Y. The Postmaster-General, April 29, 1908, issued an order forbidding the delivery of mail matter and money orders to this concern. * * * "In these advertisements he endeavors by the use of misleading and extravagant assertions to lead the reader to believe that he is a doctor of eminence in the United States, that he has discovered a wonderful

force of nature possessing marvelous curative properties, that by means of this power he is able to and will cure diseases which are generally considered hopeless. Among the representations calculated to produce this belief are those to the effect that 'with his phenomenal power this man works wonders, the blind see, the paralyzed walk * * * there is no illness which he can not cure;' he gives back health in a most incomprehensible manner to sick people who have been declared by physicians to be incurable; that he can and will cure blindness, deafness, consumption, paralysis, cancer, etc.; that he has found the most marvelous power man has so far invented. * * * His advertisements extended to the foreign press and complaints are in the case from the Italian consular agent at New York, from a member of the Berlin Press Association, from Mr. Louis Michel, a prominent American residing in Germany, and from several other persons, to the effect that Mann is swindling thousands of poor persons in Italy, Germany, France, Spain, South America, Central America, Mexico, and Cuba. One of the pamphlets issued by him states that 'we thoroughly explain to you how to renew youth and how to keep it; how to acquire force and how to use it to conquer environment.'"

OTHER FORMS OF QUACKERY.

TOPICAL REMEDIES.[a]

Among these may be mentioned the fraudulent and misleading advertisements in connection with many of the hair restoratives, tonics, hair dyes, and a number of cosmetic preparations especially intended for colored people, like "Glossine," "Anti-Kinkine," "Kinkine," "Straightine," "Ozonized Ox Marrow," for which it is claimed that they will make kinky, knotty, and curly hair straight. The hair restorers are credited with the property of producing a luxuriant growth of hair, "make the hair grow out on bald spots," "turn gray hair dark," etc.

Medical literature contains a number of instances in which symptoms of lead poisoning and cases of paralysis were traced to the habitual use of cosmetics, hair dyes, and hair restorers. In the Pharmacal Journal (Vol. LXXIV, p. 223) will be found a list of hair restorers. In 12 articles analyzed the percentage of lead varied from 0.3 to 2.32. Other drugs in such preparations have been known to produce violent inflammation of the scalp.

In this category also come some of the skin tonics, face lotions, and toilet preparations. One of the 9 analyzed contained 47 grains of corrosive sublimate and this same poison was contained in varying proportions of 1 to 15 grains per ounce in all; and yet it is claimed that they are "perfectly harmless for the removal of freckles," "to make pretty faces, etc." In discussing the subject of skin bleaches and beautifiers, Doctor Kebler says that one of the agents used for improving the complexion was found on analysis to consist largely of Rochelle salts. Another product sold under the designation of "complexion tablets" contained, among other ingredients, strychnin, and he relates an instance where a child 2½ years old accidentally consumed a number of these tablets and died from strychnin poison-

[a] See Doctor Kebler's interesting article on nostrums and fraudulent methods of exploitation, Jour. Am. Med. Assoc., Nov. 10–17, 1906.

ing. In this connection he also exposes the fraudulent claims of the Mexican Remedy Company for its "Aquamiel," "a magical bust developer and the most marvelous bust producing, blood enriching, tissue forming preparation—a product of the famous mague plant of Mexico." Analysis showed that the medicine is absolutely worthless as a tissue developer, etc. In like manner he disposes of the numerous plasters advertised as "positive cures for consumption and other ailments," "the American Herb cure," and "Force of Life remedies," "Nutriola," etc.

PRESCRIPTION NOSTRUMS.*

Since the passage of the food and drugs act, which forbids the use of any statement, design, or device which is false or misleading on the label or package of any drug product, etc., the manufacturers of nostrums found themselves seriously handicapped. But as in all diabolical pursuits, a way appears to have been found to circumvent the provisions of the law. Doctor Kebler informs us that as long as the law does not forbid the publication of misrepresentations and fraudulent statements in newspapers, this opening is taken advantage of by many promoters of medicinal agents. A rather common method is the publication in the newspapers of advertisements extolling the virtue of certain remedies in certain diseases. Often the receipt is published in connection with the advertisement or furnished upon application free of charge. The prescription, however, always contains at least one product bearing a unique coined name, the nature and composition of which is known only by the advertiser, or the parties interested in furnishing the sale of the remedy. As a result the local druggist is either unable to compound the prescription, or in doing so he is compelled to obtain it from the parties in question, or the patient is compelled to have the prescription filled by the advertiser at an exhorbitant price. Doctor Kebler states that this is really an old scheme, which was exposed in the "Druggists' Circular," page 3, 1859, in connection with the consumption cure of a fictitious Rev. Edward A. Wilson, and a questionable "Extract Blodgetti." The individual behind this scheme during recent years was a Mr. C. A. Abbott, who himself has no medical knowledge whatever, and it appeared in the recent investigation by the Post-Office Department that with regard to the Wilson Remedy, no such ingredient as extract blodgetti was used. This name was used in the prescription solely for the purpose of making it impossible for the average druggist to fill, thereby compelling the patient to send the advertiser $3 for the treatment, although he has no intention of including extract of blodgetti in the compound furnished by him on such orders. The Postmaster-General promptly issued a fraud order March 20, 1908.

Doctor Kebler calls attention to the "Arabian Sea Grass" prescription in connection with "Le Grande Arabian Recipe," exploited by a Dr. J. A. Lawrence, of Brooklyn, N. Y., "for the cure of catarrh,

* Condensation of the subject-matter contained in a special paper prepared for the Commission by Dr. Lyman F. Kebler, Division of Drugs, U. S. Dept. of Agriculture.

bronchitis, hay fever, and all diseases of the mucous membrane," and of which the "Druggists' Circular" in 1885 said:

It thus appears that 9 out of the 16 substances either do not exist or are not articles of commerce. The trap is so evident that no druggist need fail to see it, but we have no doubt that many persons are influenced to send the "Doctor" $8 for the medicines.

Doctor Kebler writes of a similar scheme under the designation of "Dr. Stevens' East India Consumption Cure," and gives the following sample of the advertisement used in newspapers:

CONSUMPTION. An old physician, retired from business, had placed in his hands by an East India missionary the formula of a simple vegetable remedy for the speedy and permanent relief of consumption, bronchitis, catarrh, asthma, and all throat and lung affections; also a positive and radical cure for nervous debility and all nervous complaints. Having tested its wonderful curative powers in thousands of cases, and desiring to relieve human suffering, I will send free of charge to all who wish it this recipe, with full directions for preparing and using. Sent by mail, by addressing, with stamp, naming this paper, W. A. Noyes, 847 Powers Block, Rochester, N. Y.

As in the case of the Wilson remedy, the patient, upon replying to the advertisement, received printed matter setting forth a prescription, testimonials, and a story telling how "Dr. Stevens," who in 1886, was afflicted with consumption, was cured through the agency of the "Sativa remedy," which he received from the hands of an aged missionary who had spent many years in India and other countries of the East, and who had given the recipe to his successor, W. A. Noyes, the present owner of the business, with the admonition to carry on the work of making the remedy known to the afflicted as long as was possible.

The prescription contained 10 ingredients, among them 2 unknown substances. Investigation by the Post-Office Department developed the fact that there was not at the time of the investigation nor had there ever been a Doctor Stevens or a missionary connected with the scheme, and a fraud order was promptly issued.

It will be readily understood that such schemes can not be carried on for any length of time without attracting the attention of the officials of the Post-Office Department or of the Bureau of Chemistry. The scheme finally evolved, according to Dr. Kebler, is "that the false and misleading representations, statements, and promises should appear in newspapers in the form of 'reading advertisements.'" The advertisement usually contained a prescription, the filling of which required several well-known efficacious agents, together with a "fancy name" product. The prospective patient was advised that the prescription could be filled by any druggist. The druggist, therefore, is made a party to the scheme. In order to render the scheme more effective, it was found desirable to place the advertisement in papers in such a manner as to make them appear either as editorials or general reading matter. As can readily be seen, this required the acquiescence and cooperation of those interested in the management of newspapers. On inquiry it was found that newspaper managers require an increased rate in placing these advertisements, double the regular price being the customary charge. From the large amount of advertising and the number of these remedies, this scheme has apparently been very attractive, not only to the newspapers, but to the promoters of these remedies as well. The earlier

mail-order remedies were intended for the ignorant classes, but the modernized scheme is for the benefit of the better educated, and that it does appeal to this class is shown by the fact that requests for information concerning the same come from lawyers, Congressmen, doctors, etc.

The following is a copy of one of the advertisements:

AN EDITOR'S ADVICE TO RHEUMATICS.

It is truly said that the "Lord tempers the wind to the shorn lamb," and He also seems to send for every ill a remedy. Modern science has done much to develop these remedies, yet sufferers from rheumatism occasionally find it hard to believe that there exists any positive relief for their distress. Nevertheless, we are in a position to recommend to our readers who suffer from rheumatism or kidney or bladder trouble or any derangement of the urinary organs an unfailing relief for their pains. This, we know, will be all the more welcome news because the remedy is easily produced.

Go ask your druggist for one-half ounce fluid extract cascara aromatic, 1 ounce of concentrated —— compound, and 4 ounces of aromatic elixir. The —— compound is put up only in 1-ounce bottles, so be sure you get the right article. Take these three things home, put them in a bottle, mix them, and take 1 teaspoonful after each meal and at bed time. For children, from one-third to one-fourth of this dose will be enough. In order to make a permanent cure doubly certain it is best to continue taking the remedy for several days after all pain and swelling have disappeared. You will then be as free from pain as if you had never known what rheumatism was.

Investigation by Doctor Kebler shows that "since the passage of the federal law about 40 of these prescription nostrums have been launched. * * * The price charged is exorbitant to a degree. * * * This is admitted even by the promoters, but the contention is that it is necessary to charge a high price because of the extensive and expensive advertising necessary to bring the remedies to the attention of the public. The men back of these schemes are usually now, or have been, connected with some advertising agency or have acted in the capacity of advertising agent of some newspaper. They have no knowledge of medicines and claim none is needed, because the large pharmaceutical manufacturers are prepared not only to supply the medicine but the medical data as well. The afflictions usually aimed at for treatment by these remedies are those affecting the lungs, stomach, liver, kidneys, and heart."

EFFICIENT WORK OF THE POST-OFFICE DEPARTMENT AND OF THE DEPARTMENT OF AGRICULTURE IN ENFORCING THE LAW AROUSES OPPOSITION.

Sufficient evidence has been presented to indicate that the executive departments of the Government are determined to administer the law upon the principle that "Righteousness exalteth a nation." It was to be expected that the promoters of fraudulent transactions would leave no stone unturned to accomplish their purpose. In the language of "Collier's Weekly," June 23, 1906:

There was an ominous presumption of foreknowledge in what Attorney Lannen, representing the National Food Manufacturers' Association in its fight for adulterated foods, said at the pure food hearing: "I say that it will be but a short time (*sic*) before the Post-Office Department will be made to conform to better rules in promoting justice."

On March 12, 1906, a bill was introduced by Mr. Crumpacker in the House of Representatives to provide for a judicial review of

orders excluding persons from the use of United States mail facilities." The effect of this legislation, in the judgment of the Post-Office Department, would be to paralyze the good work by the Government in suppressing "fake get-rich schemes," "quack medicinal cure-alls," and an inconceivable variety of confidence games perpetuated through false and misleading advertisements, such as have in the past cost the public millions of dollars.

According to the report of the Postmaster-General "over 2,400 fraud orders have been issued by the Post-Office Department under authority of the act of 1890 and the supplemental act of 1895. In less than 30 of these cases has the propriety of the order been challenged in court, and in none of them has it been held erroneous or unwarranted. This record is of exceeding significance, and shows clearly that the administration of these statutes by the Post-Office Department has been marked by the utmost care and conservatism. The period of time extends over the administration of many different Postmasters-General of varying political parties, and the same thoroughness and judicial caution have characterized the administration of the statutes by all of these officers. This record is strong assurance that their future enforcement will be marked by full regard for the rights and privileges of all citizens."

The following are extracts from the statement of the case by the People's Lobby:

FRAUD ORDERS NOW REVIEWED BY THE COURTS.

From this excerpt it is clear that the courts do now review the action of the Postmaster-General in issuing orders. In order to relieve the department of unjust criticism, however, the Postmaster-General is not opposed to an express provision of the law for a review in the manner provided by the bill prepared by Representative Foster, a member of the Judiciary Committee, which measure was passed over in favor of the Crumpacker bill.

Although the measure is of such vital importance, it was never submitted to the Postmaster-General for his opinion, nor was he asked to appear before the Judiciary Committee of the House. The Assistant Attorney-General for the Post-Office Department appeared of his own volition and argued against the bill. * * *

It is positively asserted by the Post-Office Department that the influences behind the Crumpacker bill are E. G. Lewis, of St. Louis, Mo., "Prof." Thomas F. Adkin, of Rochester, N. Y., and the "Hon." E. F. Hanson, of Chicago, Ill. Lewis was the promoter of the People's United States Bank, which was organized to transact all its business through the mails. A fraud order was issued against the People's Bank, July 6, 1905, because of the alleged false and fraudulent representations which the Postmaster-General declared Lewis made in the promotion of his scheme. Of these one of the most important was the promise that no loan of funds should be made to the president or to any of the directors of the bank. Up to the time of the issuance of the fraud order loans had been made to Lewis and to certain of his business enterprises aggregating $907,538.83 upon insufficient security or no security at all.

The action of the Postmaster-General in issuing a fraud order against the People's Bank was reviewed by the United States circuit court of appeals, and the Postmaster-General was fully sustained.

Adkin was the head of the so-called "New York Institute of Physicians and Surgeons," of Rochester, N. Y., which, in advertising a treatment for disease denominated "vitaopathy," made such extravagant claims as in the following advertisement:

"Dead man talked back to life. Miraculous rescue from grave. Medical science completely upset by Rochester wonder-worker, who restores life and heals the sick without the use of drastic drugs or the surgeon's knife; hopeless invalids restored to health.

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"I feel that it is my duty as a Christian to use this wonderful power that has been given to me for the benefit of all mankind to cast out from their body the evils of disease. I have cured them that quickly that I have been credited with working miracles."

Adkin and the "New York Institute of Physicians and Surgeons" were denied the use of the mails, and the action of the Post-Office Department was sustained by the supreme court of the District of Columbia.

Hanson organized the "Nutriola Company" at Belfast, Me., and subsequently moved his patent medicine business to Chicago, Ill. A fraud order was issued against this concern. Furthermore, Hanson was indicted and convicted on the charge of misusing the mails because some of his literature was improper and obscene. * * *

The Congressional Record bears out the charge that the Crumpacker Bill was railroaded through the House. Three days before the holiday recess the sponsor of this measure secured the passage of a resolution placing it on the calendar as a privileged bill. It is of particular importance to note that Mr. Crumpacker put through his resolution largely on this statement:

"I submitted the bill to Mr. Overstreet, the chairman of the Committee on the Post-Office and Post-Roads * * * and he said the bill ought to be passed. He has had experience enough to believe the bill ought to pass, and all I am asking now is to give the bill a status on the calendar so as it can be taken up on its merits."

Mr. Overstreet was absent when this statement was made. As a matter of fact, the chairman of the Committee on the Post-Office and Post-Roads made the strongest speech in opposition to the bill when it came up for final action January 7, 1907, and objected privately to Mr. Crumpacker that morning on the inadequate time to be allowed for the consideration and discussion of so vital a measure. Representative Mann, of Illinois, also opposed the bill in a vigorous manner.

The Crumpacker Bill is now in the Judiciary Committee of the Senate, where it is hoped more consideration will be given to the protection of the public and less weight attached to the interests of borrower Lewis, the "Hon." E. F. Hanson, and "Professor" Adkin.

It is gratifying to note that the bill was held up by the Senate Judiciary Committee for a careful consideration.

CONCLUSIONS AND RECOMMENDATIONS.

A review of the evidence in the foregoing pages reveals the fact that existing laws are insufficient to cope with the evil. The enactment of Mr. Mann's bill, House resolution, and other amendments to the poison law, while steps in the right direction, will not prevent improper traffic in the habit-forming drugs so long as we have to deal with unscrupulous persons even in the ranks of the medical, dental, or veterinary profession—and for whom adequate punishment should be provided whenever, in the judgment of the court, they have abused their professional rights and privileges. As far as the suppression of quackery is concerned, nothing short of a total exclusion from the mails of letters, newspapers, circulars, pamphlets, or publications of any kind containing any advertisement of secret remedies for the cure and treatment of disease, will reach the evil. As a matter of fact, no physician should be permitted to prescribe by mail.

In view of the importance of the subject, it is recommended that a special commission, composed of representatives of the Post-Office Department, Prof. H. W. Wiley, of the Bureau of Chemistry, and medical officers of the Public Health and Marine-Hospital Service, be appointed for the purpose of investigation and the formulation of such legislation as may be deemed necessary in the interest of public health and morals.

In the meantime, it is earnestly recommended that the Postmaster-General be requested to publish with the monthly supplements to the Official Postal Guide a bulletin setting forth the essential facts in connection with the fraud orders issued during the preceding months, such bulletins to be posted in post-offices and to be distributed in sufficient numbers along the rural-delivery routes. It is also recommended that all information concerning the harmful ingredients in foods, medicines, soft and alcoholic drinks which may come to light during the execution of the pure food and drugs law, be published by the Department of Agriculture in the same manner as farmers' bulletins are now being published. The public is entitled to be warned, and for this purpose it is essential that the indisputable facts should emanate from some official source.

The Journal of the American Medical Association has done good work in educating the medical profession, and many of our leading magazines have disseminated knowledge of this kind among their readers; but, after all, the masses must be reached in the manner indicated, as the majority of newspapers will not publish the facts.

CHAPTER XI.

SOCIOLOGICAL STUDY OF 1,251 FAMILIES.

[By G. H. WEBER, Statistician of the Commission.]

SCOPE.

The investigation, which was conducted during the months of February to June, inclusive, covered a total of 1,251 families, occupying 1,054 houses, and comprising 5,157 persons. The plan of the commission was to investigate only those families whose incomes were below $1,000 per annum. In some cases, where family incomes were greater, but where the families lived under the same general conditions and on the same streets and alleys, they were also included. In selecting the streets, courts, and alleys the aim has been to take a number of alleys where the living conditions were worst, a fairly equal number where they were medium, and a corresponding number where the conditions were the best. This was done in order to give, as nearly as possible, a true picture of the housing, social, and economic conditions of these people as a whole.

It has also been the aim of the commission to have the investigation cover a proportion of white and of colored families equal to that of the total white and colored families of that class in Washington.

The following table shows, by streets and sections, the number of houses, families, and persons included in the investigation:

	Number of houses.	Number of families.	Number of persons.		
			Adults.	Children under 16 years.	Total.
WHITE.					
Northwest:					
Twenty-seventh street	23	23	64	53	117
Cissel alley	10	10	29	22	51
Temperance avenue	(a)	1	2	0	2
Lingers court	a 1	2	4	0	4
Potomac street	b 5	10	25	27	52
Jackson Hall alley	a 12	11	53	2	55
Valley street	21	23	66	35	101
Bank street	1	1	3	0	3
Snow alley	2	2	5	3	8
Jefferson street	a 28	47	134	56	190
Thirtieth street	2	2	9	4	13
Purdys court	12	11	42	25	67
Total	c 127	143	436	227	663
Northeast:					
Gales street	35	35	104	83	187
Twentieth street	10	10	27	31	58
Brewers court	17	17	33	26	59
Pleasant alley	6	6	12	4	16
Kramer street	41	44	116	76	192
Total	109	112	292	220	512
Southeast:					
L street	39	39	96	71	167
K street	27	29	69	49	118
Fourteenth street	8	8	23	15	38
Twelfth street	17	17	41	38	79
Fifth street	6	7	18	9	27
Thirteenth street	8	8	23	10	33
Georgia avenue	23	24	68	39	107
Mechanics place	16	16	34	21	55
Total	144	148	372	252	624
Southwest:					
Rileys court	3	3	8	1	9
Twelfth street	6	7	23	22	45
Maryland avenue	16	19	50	27	77
Huntoon place	15	17	37	38	75
Armory place	3	8	57	.....	57
Union street	42	42	103	65	168
McLean street	59	60	169	79	248
Willow Tree alley	1	1	2	.....	2
Nolans court	(a)	1	2	.....	2
F street	31	33	109	69	178
Total	e 186	191	558	301	859
Total, all sections	d 566	594	1,640	1,000	2,658
COLORED.					
Northwest:					
Twenty-seventh street	13	18	51	26	77
Cissel alley	5	5	11	3	14
Temperance avenue	a 33	45	102	52	154
Lingers court	a 27	40	98	36	134
Brainard street	7	7	23	6	29
Potomac street	f 5	14	34	14	48
Jackson Hall alley	a 16	22	62	15	77
Kings court	9	12	29	9	38
Phillips court	16	16	49	27	76
Cleveland street	44	57	149	52	201
Shepherd alley	13	15	34	13	47
Valley street	29	31	88	42	130
O street alley	36	63	186	87	273
Bank street	6	7	23	17	40
Snow alley	42	53	147	55	202

a Not including 1 house occupied by both colored and white persons.
b Not including 2 houses occupied by both colored and white persons.
c Not including 6 houses occupied by both colored and white persons.
d Not including 7 houses occupied by both colored and white persons.
e Including 1 house occupied by both colored and white persons.
f Including 2 houses occupied by both colored and white persons.

	Number of houses.	Number of families.	Number of persons.		
			Adults.	Children under 16 years.	Total.
COLORED—continued.					
Northwest—Continued.					
Goat alley	39	47	113	57	170
Jefferson street	[a] 10	16	45	22	67
Johnson avenue	3	4	17	2	19
Total	[b] 353	471	1,201	535	1,796
Northeast:					
Gales street	6	6	16	6	22
Levis street	12	15	46	34	80
Brewers court	11	11	22	17	39
Total	29	32	84	57	141
Southwest:					
Armory place	3	[d] 8	[d] 25	4	29
Van street	38	41	100	47	147
Willow Tree alley	31	49	118	43	161
Nolans court	[a] 34	46	109	73	182
F street	6	10	34	9	43
Total	[a] 112	154	386	176	562
Total, all sections	[c] 494	[d] 657	[d] 1,731	768	2,499
Total, white and colored	[c] 1,060	[d] 1,251	[d] 3,389	1,768	5,157

[a] Including 1 house occupied by both colored and white persons.
[b] Including 6 houses occupied by both colored and white persons.
[c] Including 7 houses occupied by both colored and white persons.
[d] Includes 2 mixed families, 7 white and 5 colored adults living together, all counted as colored.

Of the 1,251 families investigated 594, or 47½ per cent, were white and 52½ per cent were colored, and of the total persons constituting these families 2,658, or 51½ per cent, were white, and 2,499, or 48½ per cent, were colored.

LIVING CONDITIONS.

The poorer people of Washington, unlike those of most other cities, live mainly in small one-family houses. This is shown by the fact that 2,151 families visited occupied 1,054 separate houses. These houses are nearly all old two-story brick or frame buildings without such modern conveniences as hot and cold water, bathrooms, or inside water-closets. Cases of overcrowding were common, especially among the colored people, in some instances as many as eight or ten people occupying one bedroom at night. Cases were also common where families crowded in one or two rooms at night when sitting or dining rooms could have been utilized for sleeping purposes. In general, however, where apartments were small and families large, all available space, even the kitchens, were used as bedrooms. While the number of families keeping boarders or lodgers was comparatively small, not a few cases were found where members of families of both sexes, old and young, slept in the same rooms with lodgers. The moral and sanitary effects of such conditions are obvious.

INCOME AND EXPENDITURES.

In the case of 1,217 families, for which fairly accurate returns were made concerning income and expenditures, 476, or 39 per cent, had a family income of $500 or less per annum; 159, or 13 per cent, had an income of from $500 to $600; 153, or 12½ per cent, from $600 to $700; 153, or 12½ per cent, from $700 to $800; 89, or 7 per cent, from $800 to $900; 93, or 8 per cent, from $900 to $1,000; 82, or 7 per cent, from $1,000 to $1,500; and 12, or 1 per cent, had an annual income of over $1,500.

The average income and expenditures for each of these groups are shown in absolute and relative figures in the following tables:

Average annual expenditures of one family.

Income.	Number families in class.	Average size of families.	Average income per family.	Rent.	Food.	Fuel and light.	Clothing.	Insurance.	Sickness and death.
Class A, $500 or under	476	3.11	$361.35	$72.69	$146.85	$26.25	$32.54	$12.26	$5.43
Class B, $500 to $600	159	3.94	546.31	97.44	220.55	33.88	53.62	20.24	5.05
Class C, $600 to $700	153	4.18	638.57	105.16	265.55	32.18	69.67	19.05	6.77
Class D, $700 to $800	153	4.40	749.91	119.04	296.54	38.01	82.75	16.08	9.90
Class E, $800 to $900	89	4.79	846.93	115.12	341.65	37.03	97.68	23.79	10.51
Class F, $900 to $1,000	93	4.77	921.41	127.36	340.73	38.91	104.13	24.22	8.89
Class G, $1,000 to $1,500	82	5.48	1,182.93	135.52	378.74	41.81	148.48	31.08	15.46
Class H, $1,500 and upward	12	4.50	1,899.58	100.58	401.00	49.83	193.16	32.83	47.83

Income.	Number families in class.	Average size of families.	Patent medicines.	Liquor.	Tobacco.	Amusement.	Miscellaneous or other.	Total.	Surplus.
Class A, $500 or under	476	3.11	$0.97	$8.82	$4.72	$5.02	$34.34	$349.88	.....
Class B, $500 to $600	159	3.94	1.18	16.44	7.64	11.27	69.36	526.67	$19.64
Class C, $600 to $700	153	4.18	1.69	21.08	11.10	14.52	74.23	622.00	16.57
Class D, $700 to $800	153	4.40	1.35	18.67	13.12	28.91	82.35	706.72	43.19
Class E, $800 to $900	89	4.79	1.40	12.77	13.52	20.96	102.64	787.06	59.87
Class F, $900 to $1,000	93	4.77	.97	15.31	16.25	41.41	109.90	827.99	93.42
Class G, $1,000 to $1,500	82	5.48	3.71	14.78	12.53	38.40	210.02	1,090.51	152.40
Class H, $1,500 and upward	12	4.50	2.08	21.25	19.50	73.00	241.16	1,182.22	717.36

Showing same averages by percentage.

Income.	Number families in class.	Average size of families.	Gross income, per cent.	Rent.	Food.	Fuel and light.	Clothing.	Insurance.	Sickness and death.
Class A, $500 or under	476	3.11	100.00	21.37	43.68	6.74	8.99	2.80	2.12
Class B, $500 to $600	159	3.94	100.00	17.56	43.89	5.41	9.90	3.04	.81
Class C, $600 to $700	153	4.18	100.00	17.17	41.40	4.88	10.53	2.67	1.00
Class D, $700 to $800	153	4.40	100.00	15.04	40.21	4.89	11.14	2.27	1.49
Class E, $800 to $900	89	4.79	100.00	13.31	41.92	4.33	11.59	2.77	1.30
Class F, $900 to $1,000	93	4.77	100.00	13.60	38.43	4.05	11.70	2.90	1.16
Class G, $1,000 to $1,500	82	5.48	100.00	10.96	33.38	3.34	11.55	2.39	1.34
Class H, $1,500 and upward	12	4.50	100.00	5.37	21.03	2.77	10.23	1.90	3.22

Income.	Number families in class.	Average size of families.	Patent medicines.	Liquor.	Tobacco.	Amusements.	Miscellaneous or other.	Total.	Surplus.
Class A, $500 or under	476	3.11	0.29	1.97	1.21	1.47	7.76	98.39	3.18
Class B, $500 to $600	159	3.94	.16	2.33	1.45	2.76	10.78	97.73	2.42
Class C, $600 to $700	153	4.18	.18	3.27	1.82	2.66	11.20	96.82	3.18
Class D, $700 to $800	153	4.40	.18	2.32	1.71	3.52	10.78	94.10	5.90
Class E, $800 to $900	89	4.79	.13	1.39	1.52	3.43	12.04	93.76	6.28
Class F, $900 to $1,000	93	4.77	.11	1.89	1.76	3.95	11.89	91.42	8.88
Class G, $1,000 to $1,500	82	5.48	.23	1.41	1.19	3.97	14.01	86.29	13.71
Class H, $1,500 and upward	12	4.50	.14	.90	1.02	4.00	14.08	64.58	35.42

Average weekly expenses (per cent).

Income.	Meats.	Fats.	Sugar.	Bread.	Vegetables.	Fruit.	Coffee.	Tea or cocoa.
Class A, $500 or under	1.13	0.24	0.13	0.48	0.53	0.16	0.13	0.07
Class B, $500 to $600	1.07	.38	.19	.62	.80	.13	.17	.13
Class C, $600 to $700	1.84	.38	.18	.65	1.06	.18	.23	.15
Class D, $700 to $800	2.16	.42	.21	.64	1.42	.22	.27	.15
Class E, $800 to $900	2.38	.51	.23	.82	1.50	.23	.28	.18
Class F, $900 to $1,000	2.27	.51	.22	.74	1.66	.33	.33	.20
Class G, $1,000 to $1,500	2.76	.85	.28	1.00	1.84	.35	.35	.17
Class H, $1,500 and upward	3.31	.95	.30	1.75	1.02	.38	.32	.11

These figures show actual money received and expended. In the expenditures no items appear unless they represent money actually paid out. Where items of rent, food, clothing, etc., were unpaid at the close of the year they do not figure in the expenditures.

The average family, with an income of $500 or less per annum, expended about $6 per month for rent, this item constituting about 21 per cent of the total family income. The average monthly rents for the other six groups were about $8, $9, $10, $9.50, $10.50, and $11, respectively. It will be observed, by consulting the second table, that the proportion of income paid for rent diminishes steadily with the increase in the family income. Thus, an average family with an income of $500 or less expended 21 per cent for rent; an average family with an income of $500 to $600 expends 17½ per cent; $600 to $700, 17⅛ per cent; $700 to $800, 15⅝ per cent; $800 to $900, 13¼ per cent; $900 to $1,000 13⅜ per cent, an average family with an income of $1,000 to $1,500, and living in the territory investigated, expends only about 11 per cent of its income for rent.

In the matter of food the average family earning $500 or less expended about $147 per year, or about 44 per cent of the total income. This proportion also decreases almost steadily with the increase in income, the average family in the highest class paying proportionately only about 21 per cent of its income for food.

The same is true with regard to fuel and light, for which the average family of the lowest income group pays $26, or 6¾ per cent, for fuel and light, while the average family of the highest income group pays about $42, or 2¾ per cent.

While for these necessities of life, i. e., shelter, food, heat, and light, the proportion of expenditure increases with the decrease of income, it is not so with other items. In the matter of clothing, the proportion increases steadily from 9 to about 11¾ per cent in the first six income groups, namely, those of $1,000 and under, and then decreases to 10¾ per cent in the highest income group. The proportion of the income paid for insurance varies irregularly in the different income groups, being distinctly higher, however, in the case of families with incomes of less than $1,000 than in the case of families whose incomes are higher. The items of amusements, like that of clothing, increases proportionately with the increase in family income. The other items of expenditure show no marked tendency to increase or decrease in family income.

The expenditures for liquor and tobacco, as shown in the table, are probably less than those actually incurred, as all the investigators report a tendency on the part of the families visited to minify this item of expense. As it is, however, it shows that by eliminating this useless expense an average family earning $500 or less per annum could save over $12 per year, which, if added to the rent, would materially improve the home conditions of the family. In the case of the other families with incomes of $1,000 or less per annum, the average annual expenditures for liquor and tobacco range, in the different income groups, from about $24 to $32. Taken as a whole, the families investigated could add on an average of at least one room each to their overcrowded homes if the money expended for intoxicants and tobacco were devoted to the payment of rent.

Sickness and death (including expenditures for patent medicines) caused an annual expenditure ranging, in the different income groups, from about $6.50 to $50 per annum.

The surplus remaining after deducting the annual family expenditures from the annual family incomes, as shown by the income groups, increased steadily with the family income, ranging in amount from $6.40 in the lowest group ($500 per annum and under) to $718.92 in the highest group. It must be remembered that this last group consists largely of families who live in the environments where they were found on account of business interests, such as families of grocers, saloon keepers, etc., or of foreign males who maintain cooperative households and send a large part of their earnings to their dependents abroad.

The 1,123 families whose incomes were less than $1,000 per annum had an average income per family of $559 per year. Of this average income, $435, or 78 per cent, were expended for actual necessities, namely, for rent, food, fuel, clothing, insurance, sickness, medicines,

and death. This leaves but $124, or 22 per cent, for all other expenditures and for savings. Of this balance $23, or 4 per cent of the entire income, were expended for intoxicating liquors and tobacco; $15, or 3 per cent, for amusements; $63, or 11 per cent, for miscellaneous; leaving $23, or 4 per cent of the average income, to be laid aside as savings.

OCCUPATIONS.

Of the total occupants of the houses visited, the occupations of 2,413 wage-earners were ascertained. Of these 821 were white males, 708 were colored males, 153 were white females, and 731 were colored females. It will be noticed that of the white people visited and whose occupations were reported, only about 17½ per cent were females, while of the colored people over one-half of the wage-earners were females.

Of the white males, about 42½ per cent were skilled workers, such as carpenters, painters, machinists, etc.; 27½ per cent were unskilled laborers; 9¼ per cent were clerks, salesmen, etc.; 8 per cent were peddlers and hucksters; 5½ per cent were drivers and teamsters. The remaining 7¼ per cent were shopkeepers, persons engaged in personal or domestic service, and various other occupations.

Of the colored male wage-earners, 56½ per cent were unskilled laborers; 19½ per cent were drivers and teamsters; 7½ per cent were engaged in personal or domestic service; 5¾ per cent were skilled workers; 2 per cent were clerks, salesmen, etc., and the remaining 8¾ per cent were in other occupations.

Of white female wage-earners, 38½ per cent were clerks, saleswomen, etc.; 15¾ per cent were dressmakers and seamstresses; 7¾ per cent were laundresses; 7¼ per cent were engaged as cooks and domestic servants; 6½ per cent were charwomen; 5¼ per cent were shopkeepers, and 4 per cent were waitresses and dish washers; the remaining 15 per cent being employed as nurses, hucksters, and in other occupations.

Of the colored female wage-earners, 57¼ per cent were laundresses; 34¼ per cent were cooks and domestic servants; 3 per cent were dressmakers and seamstresses; 2¾ per cent were charwomen, and the remaining 2¾ per cent were waitresses, dish washers, nurses, schoolteachers, shopkeepers, etc.

These occupation statistics show that the colored population was engaged mainly in the unskilled manual occupations and in personal or domestic service, while the white population were mostly engaged in somewhat higher-class work.

The two following tables show the number of persons engaged in each of the leading occupations in each section of the city and in the entire district covered by the investigation:

Occupation of males.

Occupation.	White.					Colored.					Total white and colored.
	North-west.	North-east.	South-west.	South-east.	Total.	North-west.	North-east.	South-west.	South-east.	Total.	
Bricklayers	5	2	2	3	12	.....	.....	.....	.....	.....	12
Carpenters	3	18	14	11	46	2	.....	.....	.....	2	48
Engineers	6	1	4	3	14	2	.....	.....	.....	2	16
Machinists	1	2	5	17	25	.....	.....	.....	.....	.....	25
Motormen	1	.....	10	2	13	.....	.....	.....	.....	.....	13
Painters	7	10	2	15	34	2	.....	.....	.....	2	36
Paper hangers	.....	16	.....	2	18	.....	.....	.....	.....	.....	18
Tinners	7	4	1	.....	12	.....	.....	.....	.....	.....	12
Other skilled laborers	50	37	39	42	168	23	3	8	.....	34	202
Unskilled laborers	41	35	100	41	226	276	14	110	.....	400	626
Drivers and teamsters	17	7	16	6	46	107	8	23	.....	138	184
Clerks, salesmen, etc	21	10	28	17	76	10	2	3	.....	15	91
Personal service	4	.....	1	.....	5	42	3	8	.....	53	58
Peddlers and hucksters	48	4	5	8	65	8	.....	.....	.....	8	73
Shop keepers	11	4	1	1	17	3	.....	2	.....	5	22
Other independent workers	4	.....	1	.....	5	1	.....	.....	.....	1	6
Miscellaneous	13	5	21	.....	39	46	2	.....	.....	48	87
Total	239	155	259	168	821	522	32	184	.....	708	1,529

Occupation of females.

Occupation.	White.					Colored.					Total white and colored.
	North-west.	North-east.	South-west.	South-east.	Total.	North-west.	North-east.	South-west.	South-east.	Total.	
Charwomen	4	.....	3	3	10	10	1	9	.....	20	30
Clerks, saleswomen, etc	15	9	18	17	59	.....	.....	.....	.....	.....	59
Cooks	.....	1	1	.....	2	61	.....	19	.....	80	82
Dressmakers and seamstresses	10	.....	8	6	24	13	5	3	.....	21	45
Hucksters	.....	2	.....	1	3	.....	.....	.....	.....	.....	3
Laundresses	3	5	3	1	12	324	13	81	.....	418	430
Nurses	2	.....	1	.....	3	4	1	1	.....	6	9
School teachers	.....	.....	.....	.....	.....	.....	2	.....	.....	2	2
Servants, domestic	2	3	4	.....	9	143	4	23	.....	170	179
Shop keepers	2	3	3	.....	8	.....	.....	2	.....	2	10
Waitresses and dish washers	2	2	2	.....	6	5	.....	1	.....	6	12
Miscellaneous	4	1	10	2	17	5	.....	1	.....	6	23
Total	44	26	53	30	153	565	26	140	.....	731	884

Of the total number of white wage-earners enumerated, 101, or 10¼ per cent, were reported as being members of labor organizations; and of the colored wage-earners only 1½ per cent belonged to labor unions.

HOURS OF LABOR.

The hours of labor of these wage-earners varied from two to eighteen per day, the number working more than ten and less than eight being comparatively small. Of the total number reporting hours of labor, 25¾ per cent worked eight hours per day; 11½ per cent worked nine hours, and 22 per cent worked ten hours per day. These, together with a small number working eight and one-half and nine and one-half hours per day, make the total number working from eight to ten hours per day equal to about 61 per cent of the persons whose hours of labor were reported. Of the rest about 3½ per cent of the entire number worked less than eight hours; 22 per cent worked over ten hours, and 13½ per cent worked at irregular hours.

Those working over ten hours per day were mainly colored laundresses and female domestic servants.

The following table shows the number of white and colored wage-earners classified according to the number of working hours per day:

Time employed per day.

	White.					Colored.					Total white and colored.
	Northwest.	Northeast.	Southwest.	Southeast.	Total.	Northwest.	Northeast.	Southwest.	Southeast.	Total.	
1 hour											
1½ hours											
2 hours	2				2	3				3	5
2½ hours											
3 hours						4				4	4
3½ hours			1		1	1				1	2
4 hours			1		1	6		1		7	8
4½ hours	1				1						1
5 hours	1	2		1	4	5		2		7	11
5½ hours	1	1			2						2
6 hours						11	2	3		16	16
6½ hours	1				1						1
7 hours	2		3		5	8		2		10	15
7½ hours	1		4		5						5
8 hours	71	62	86	84	303	131	8	91		230	533
8½ hours	1	9	4	1	15	4		1		5	20
9 hours	5	36	30	84	155	60	2	21		83	238
9½ hours		2	6		8	2		1		3	11
10 hours	49	33	115	29	226	165	5	57		227	453
10½ hours			11		11	1		1		2	13
11 hours	15	1	6	1	23	41	1	12		54	77
11½ hours											
12 hours	13	7	9		29	172	6	73		251	280
13 hours	1	2			3	13	3	3		19	22
14 hours	2	3	2	1	8	37		3		40	48
15 hours						3	3	1		7	7
16 hours	1	1			2	1		1		2	4
17 hours											
18 hours		1			1	2	1			3	4
Irregular	57	26	71		154	89	15	23		127	281
Total	224	186	349	201	960	759	46	296		1,101	2,061

EMPLOYMENT.

In the case of 2,439 wage-earners returns were made concerning the continuance of employment during the year covered by the investigation. Of these, 993 were white and 1,446 were colored wage-earners.

Of the white wage-earners, 581, or 58½ per cent, were employed the entire year; 42, or 4¼ per cent, were idle an average of 11 weeks on account of illness, and 370, or 37¼ per cent, were idle an average of 16¼ weeks for other reasons. Of the whole number of white wage-earners (including those working full time) the average time lost during the year was about 6¼ weeks out of the 52.

The colored wage-earners show a larger proportion of unemployment, if the latter is measured by the number of persons idle, but the average time lost of all colored wage-earners is almost the same as that of the white. Thus, of 1,446 colored wage-earners, 634, or 43¾ per cent, worked the full 52 weeks; 161, or 11¼ per cent, were idle an average of 5.4 weeks on account of sickness, and 651, or 45 per cent, were idle an average of 13.4 weeks for other reasons. The average period of idleness of all colored wage-earners was a little less than

6¾ weeks. It appears, therefore, that while the white wage-earners are more steady in their employment, their periods of unemployment, both on account of illness and for other reasons, are longer than those of the colored wage-earners.

The figures of unemployment are shown by color and geographical section in the following table:

Weeks employed.

	Total wage-earners reporting.	Wage-earners employed 52 weeks.	Wage-earners idle on account of illness.			Wage-earners idle for other reasons.		
			Number.	Total weeks idle.	Weeks idle per person.	Number.	Total weeks idle.	Weeks idle per person.
WHITE.								
Northwest	268	156	12	111	9.3	98	1,627	16.6
Northeast	177	80	13	190	14.7	84	1,569	18.7
Southwest	342	204	15	148	9.8	123	1,834	15.0
Southeast	206	139	2	16	8.0	65	1,039	16.0
Total	993	581	42	465	11.1	370	6,069	16.4
COLORED.								
Northwest	1,088	511	122	673	5.5	455	6,809	15.1
Northeast	57	43	1	5	5.0	13	150	11.5
Southwest	301	80	38	199	5.2	183	1,691	9.3
Southeast								
Total	1,446	635	161	877	5.4	651	8,713	13.4
Total white and colored	2,439	1,215	203	1,342	6.6	1,021	14,782	14.5

Average weeks idle per wage earner:
White 6.5
Colored 6.6

The reasons given for unemployment are very meager, the persons visited being generally averse to answering this inquiry. In the case of white wage-earners, the reasons given were inability to secure work in 43 cases; illness in 42 cases; old age in 4 cases; drunkenness in 3 cases; bad weather in 3 cases, and laziness in 1 case. Among the colored people the causes assigned were illness in 161 cases; inability to secure work in 62 cases; laziness in 11 cases; bad weather in 11 cases; old age in 8 cases; drunkenness in 5 cases; incapacity in 2 cases, and lack of skill in 1 case.

WAGE-EARNERS' LUNCHES.

Inquiries concerning the meals of wage-earners brought out the information that in 678 cases they were compelled to eat cold victuals, 750 carried dinner pails, and 205 were reported as being accustomed to consume alcoholic beverages with their meals. The number in each case was greater among the white than among the colored wage-earners.

SICKNESS.

The returns concerning illness show that of a total population of 5,157 persons enumerated, there had been 613, or 12 per cent, sick during the past year. It is very likely, however, that in this enumeration many cases of slight illness had been forgotten by the families when visited, as the actual sickness rate must have been much higher. This rate was considerably higher among the colored than among

the white population. The average duration of sickness per case was reported to be 29½ days for a total of 607 cases. The average duration of illness was reported to be much longer in the case of colored than of white persons, namely, 22.4 days and 35.6 days, respectively.

The deaths reported during the past year were likewise surprisingly few, although the investigators made a special effort to obtain complete returns. Thus, there were reported but 23 deaths among the white, and 34 deaths among the colored population, making a death rate of 9 and 13 per 1,000 respectively, figures which are obviously too low. The most frequent causes of death reported were tuburculosis, 11 cases; pneumonia, 7 cases; heart disease and indigestion, each 4 cases.

The cases of permanent disability as shown by the returns are comparatively few, namely, 42. The age was reported in 39 cases, of which 3 were persons 19 years of age or under; 14 persons 20 to 49 years; 19 persons 50 to 79 years, and 3 persons 80 years of age or over. The most frequent causes of permanent disability were rheumatism, 8 cases; senility, 7 cases, and tuberculosis, 5 cases.

INSURANCE.

A surprisingly large number of persons were found to carry life or sick insurance. In tabulating insurance returns only members of families, exclusive of boarders and lodgers, were considered, because such returns concerning the latter would necessarily be incomplete. It was found that of a population of 4,889, 2,202, or 45 per cent, carried life insurance of some sort, and 855, or 17½ per cent, carried insurance against sickness. The insurance was almost entirely carried in either industrial insurance companies or in fraternal or other mutual benefit associations, and the premium payments were usually made in weekly installments. About the same proportion of white and colored persons carry this insurance, although there were proportionately more white carrying life insurance and proportionately more colored people carrying sick insurance. The next table gives the details by color and geographical sections:

Entire city.	Total families.	Members of families, exclusive of boarders and lodgers.	Members of families carrying—	
			Life insurance.	Sick insurance.
WHITE.				
Northwest	143	611	363	27
Northeast	112	501	331	25
Southeast	148	620	150	7
Southwest	191	861	351	31
Total	594	2,593	1,195	90
COLORED.				
Northwest	471	1,964	720	591
Northeast	32	127	41	31
Southeast				
Southwest	156	605	246	140
Total	657	2,296	1,007	765
Grand total	1,251	4,889	2,202	855

INSTALLMENT PAYMENTS.

The investigators found it exceedingly difficult to obtain information concerning installment payments on furniture, clothing, and money borrowed, and in many cases the families refused to answer this inquiry. The returns, therefore, are necessarily somewhat meager.

Transactions of this kind were found to be much more frequent among the colored than among the white population. Of 136 families who answered affirmatively the inquiry concerning furniture purchases on the installment plan, 35 were white and 66 were colored. The total cost of the furniture so purchased was greater, however, in the case of the white than of the colored people, namely, $3,235 and $2,871, respectively. Under furniture were also included one watch, one graphophone, and four pianos. Clothing was reported purchased on the installment plan in 5 cases of white and 8 cases of colored families, the total cost of the clothing being $121 and $162, respectively. The furniture and clothing installment payments were usually made weekly.

LOAN COMPANIES.

The practice of borrowing money for repayment on the installment plan appears to have been confined mostly to the colored people, only 3 white families having reported such transactions as against 26 colored families. The total amount borrowed in this way was $130 by the white, and $420 by the colored families. It was not possible in all these cases to ascertain the terms of repayment upon which these loans were made, but a sufficient number of cases is given below to show the exorbitant rates paid for the same:

Amount borrowed.	Monthly payments.	Number of months.	Amount repaid.	Charges.
$15	$3.50	6	$21.00	$6.00
14	3.40	6	20.40	6.40
20	3.00	8	24.00	4.00
15	e.70	e46	32.20	17.20
10	2.60	6	15.60	5.60
10	2.95	6	17.50	7.50
10	2.20	8	17.60	7.60
15	2.65	10	26.50	11.50
20	3.50	10	35.00	15.00
25	3.80	10	38.00	13.00
10	2.25	8	18.00	8.00
15	3.00	6	18.00	3.00
15	3.70	6	22.20	7.20
25	4.50	9	40.50	15.50
15	2.75	9	24.75	9.75
10	3.00	6	18.00	8.00
10	e.70	e28	19.60	9.60
15	2.70	9	24.30	9.30
25	6.10	6	36.60	11.60
5	2.60	24	6.50	1.50

e Weekly.

ILLITERACY.

In tabulating the statistics of illiteracy only those persons were considered who had passed the school age, namely, 14 years and over. Of 4,161 such persons, 502, or 12.1 per cent, were unable to read or

write. The percentage of illiteracy was more than three times as great among the colored than among the white population, namely, 17.5 and 5.4 per cent, respectively. In the case of both white and colored the percentage of illiteracy was greater among the males than among the females. The following table shows the data concerning illiteracy by sex and color for each section:

	Total persons 14 years of age and over.			Illiterates 14 years of age and over.		
	Male.	Female.	Both sexes.	Male.	Female.	Both sexes.
WHITE.						
Northwest	310	264	574	30	20	50
Northeast	154	155	309	3	5	8
Southeast	189	195	384	1	.....	1
Southwest	323	280	603	38	4	42
Total	976	894	1,870	72	29	101
Per cent	.....	.....	.....	7.37	3.24	5.40
COLORED.						
Northwest	523	689	1,212	102	169	271
Northeast	42	48	90	3	8	10
Southeast	.....	.....	.....	.....	.....	.....
Southwest	176	490	989	62	58	120
Total	741	1,227	2,291	167	235	401
Per cent	.....	.....	.....	22.5	19.1	17.5
Grand total	1,717	2,121	4,161	239	264	502
Per cent	.....	.....	.....	13.9	12.4	12.1

SCHOOL ATTENDANCE.

Figures showing school attendance are given in the next table:

	Children 7 to 14 years of age.									Children under 7 attending school.	Children over 14 attending school.
	Total.	Attending school.						Not attending school.			
		Less than 5 weeks.	5 and less than 10 weeks.	10 and less than 20 weeks.	20 and less than 30 weeks.	30 weeks and over.	Total.				
WHITE.											
Northwest	110	.....	2	4	3	92	101	8		6	10
Northeast	102	.....	.....	3	9	79	91	11		12	13
Southwest	162	1	.....	39	3	110	153	10		7	13
Southeast	123	.....	.....	.....	54	64	118	5		5	10
Total	497	1	2	46	69	345	463	34		30	46
COLORED.											
Northwest	249	1	.....	30	7	167	205	44		10	26
Northeast	32	.....	.....	.....	1	28	29	3		3	5
Southwest	110	2	.....	14	2	82	100	10		5	12
Southeast	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....
Total	391	3	.....	44	10	277	334	57		18	43
Grand total	888	4	2	90	79	622	797	91		48	89

It will be observed that a considerable number of children of compulsory school age were found who had either not attended school at all during the past year or who attended less than one-half of the school term. Thus, 91 children from 7 to 14 years of age had been kept out of school the entire year, and 96 were in school less than twenty weeks during the year. Those not attending at all were mostly colored children. On the other hand 48 children under 7 years and 89 children over 14 years of age were found attending school. In 40 cases children were kept out of school some time during the year on account of a lack of the necessary clothing. Of these 7 were white and 33 were colored children.

CHAPTER XII.

THE BUSINESS RELATIONS OF WAGE-EARNERS.

[By JAMES BRONSON REYNOLDS.]

In proportion as wealth increases devices for its protection increase in number, quality, and efficiency. As wealth diminishes its safeguards diminish. When extreme poverty is reached the supposed agencies of protection are frequently not only nonprotective, but actually predatory. Among such are employment agencies where the wage-earner seeks work; pawn shops and loan companies for the wage-earner's borrowing; industrial insurance companies and mutual benefit societies for his saving, and installment-payment concerns where he purchases on credit.

Believing that the regulation, protection, and promotion by the government of these instrumentalities are quite as important to the industrial class as the protection of the home and the workshop through sanitary and factory legislation, this commission has indorsed the recommendations made to the President by the writer that a new department of housing and labor be created to have direct and complete supervision of these business enterprises. This proposed department would not merely exercise the powers of restraint at present intrusted chiefly to the police, but in addition would promote efficiency of service.

In view of the recommendation above mentioned, it is appropriate to indicate the present condition of these enterprises and to state the character and extent of the improvements advocated.

EMPLOYMENT AGENCIES.

There were formerly about 25 employment agencies in the District. They were nominally under the control of the police, but a careful investigation showed that the police gave them very slight attention unless specific complaints were presented. Most of these agencies were indifferent to the character and occupation of the employers to whom they sent employees. This was especially true in regard to domestic agencies. The agencies which placed laborers took advantage of the applicants through fraud and misrepresentation and were careless in the fulfillment of their obligations to employers and employees.

The present employment agency law, passed in 1907, while inadequate in some respects, has produced a decided improvement in the service and paved the way for further progress. At present there are only eleven licensed employment agencies. Before taking out a license an agent must give a bond and furnish evidence of ability to carry on the business in proper manner. The character of the applicant is investigated by the police department. These agencies have been inspected at frequent intervals in the past, and with the beginning of the new license year the inspection will be made monthly. Complaints against agencies under the present law are investigated by the District Commissioners. During the past year nine hearings were granted to persons bringing charges against employment agencies.

This service is probably as good as could be obtained under the existing law, but there are two serious defects in the law.

1. Supervision by the police is inadequate. The work of the police must inevitably be confined to penal offenses. The regulation and supervision of the efficiency of employment agencies is necessary and should be performed by some properly constituted public authority.

The effective distribution of labor is of such supreme importance to the entire community that either employment agencies must receive competent public supervision, or the European method of government employment agencies, such as those of France and Germany, should be adopted. This commission has preferred to adopt the more conservative alternative.

2. Complaints should be tried not by the head of the Distirct government, as at present, but by the official having direct oversight of the agencies. If the proposed department of housing and labor were established, the chief of the appropriate bureau or the head of the department, both of whom would be closely in touch with the service, should be the proper parties to conduct investigations and trials.

PAWN SHOPS.

There are at present eight pawn shops in the District of Columbia. The legal rate of interest charged is 3 per cent a month. The present law has some excellent features. A report on articles pawned is made daily to the police, and pawn shops are directly connected with police headquarters by an electric call bell. The records are open at all times to police inspection, and a proper bond must be filed to secure the observance of the law and the recovery on judgments against pawnbrokers.

The pawn shop is the only public agency for lending money to which the poor can resort, and since it is likely that recourse thereto will occur in times of extreme need, the terms of lending should be as moderate as circumstances will permit. It is commonly supposed that the pawnbroker lends as little as possible on articles pawned. Careful inquiry and investigation reveal the fact that the high rate of interest disposes the pawnbroker to lend as much as possible. As the pawnbroker takes advantage of the improvidence of the borrower and derives his profit from the interest charge, he determines the amount to be advanced by his estimate of the likelihood of the redemption of the article pawned. If a lower rate of interest were charged, a smaller sum would be loaned, but a lighter burden would

be imposed on the borrower. The experience of the Provident Loan Society of New York City, which has rendered most important service to the community, is suggestive. Regular New York pawn shops charging 3 per cent a month for the first six months, and 2 per cent thereafter, report that from 70 to 80 per cent of the articles pawned are redeemed. The Provident Loan Society, charging but 1 per cent a month, reports that from 98 to 99 per cent of articles pawned are redeemed. It is probable that the loans made by the Provident Loan Society on given articles are frequently less than corresponding loans made by the pawn shops. The policy of the Provident Loan Society, however, encourages redemption of valuable articles, while that of the average pawn shop encourages improvidence with ultimate heavy loss. Such features in the conduct of pawn shops merit the careful attention of public authorities quite as much as do the discovery and return of stolen articles, now the main concern of the police.

LOAN COMPANIES.

There are no official statistics regarding loan companies in the District. Their number is variously estimated to be from 50 to 80. They are wholly without public supervision, though Commissioner West states that "the question of licensing, regulating, and inspecting these loan companies is, in my judgment, one of the most important matters to be accomplished." During the last session of the Congress a measure was drafted at the request of Commissioner West by the corporation counsel of the District and introduced in both Houses. Investigations made by Commissioner West showed that these companies sent out circulars to school teachers, department clerks, and others, urging them to borrow money. The natural result of this solicitation was to stimulate the borrowing habit. It was also reported to this commission by various chiefs of the National Government that their subordinates were frequently led, through the plausible representations of the companies, to reckless borrowing, leading to subsequent embarrassment. It is beyond question that such companies render a necessary service, but they should be so supervised and controlled by public authority that their transactions would be beneficial instead of debauching.

The borrowing of money for repayment on the installment plan, found in the investigation of this commission to be confined mostly to colored people, is a device of certain loan companies which merits the most careful scrutiny. It was not possible in all the cases investigated to ascertain the terms of repayment upon which loans were made, but a sufficient number were secured to show that exorbitant rates were charged.

INSURANCE.

When the department of insurance was created January 1, 1902, the superintendent found eleven companies undertaking industrial or sickness, accident, and death insurance. Seven of these were District of Columbia corporations. They had 19,661 policies in force, representing $656,917 worth of insurance. The four foreign corporations had 4,978 policies in force, representing $179,587 worth of insurance.

The superintendent at first refused to relicense them, but subsequently, recognizing that it would be a hardship to thousands of innocent policyholders to deprive them of their insurance, consented to grant licenses. At the present time nearly all of the companies refuse to pay the tax on their premium receipts, and consequently they are not licensed or examined pending the final decision by the court of their obligation to be taxed.

There is, however, supervision over the Metropolitan, Prudential, and other large insurance corporations which obey the law as construed by the department. The lack of law governing the industrial assessment companies is fully appreciated by the Commissioners, and various bills to remedy existing deficiencies have been introduced at the request of the Commissioners and of the insurance department. As insurance is one of the most notable agencies for the encouragement and practice of saving and thrift, its thorough supervision is highly in the public interest.

We also believe that the friendly or mutual benefit societies which are under public supervision in most European countries should be under government inspection in the District. Such inspection would undoubtedly be in the interest and to the advantage of the members of such societies, but as many organizations prefer their independence without interference, rather than the protection afforded by government supervision, it might be sufficient to provide that the superintendent of insurance should have power to inspect and report the condition and solvency of such organizations upon the request of the officers or of a certain number of members paying dues and eligible to benefits.

INSTALLMENT PAYMENTS.

The purchase of articles on the installment plan offers undeniable advantages to people with limited means, and especially to those beginning housekeeping with small capital and no reserve. It must, therefore, be regarded as an established and valuable feature of the business relations of the wage-earning class. Abuses under the system are, however, not infrequent and impositions are often practiced. Some measure of public supervision should be exercised over such transactions, at least to the extent of requiring that concerns doing business on this plan should be registered and their transactions subject to the scrutiny of the department of housing and labor.

CHAPTER XIII.

THE SCALE OF WAGES AND THE COST OF LIVING.

[By GEO. M. KOBER, M. D.]

The Bureau of Labor has conducted an investigation on the subject of wages based on a large number of establishments in the chief manufacturing and mechanical industries in the United States. The results are set forth in Bulletin 77, July, 1908.

The retail prices of food are shown in a succeeding article of the bulletin. From these investigations we learn that, with the single exception of the year 1907, the scale of wages per hour has increased with the increased cost of living. In brief, wages in 1907 were 28.8

per cent higher than the average for the entire period from 1890–1899, or 31.6 higher than in 1894, the year of lowest wages. The variation in the purchasing power of wages may be measured by using the retail prices of food, the expenditures for which constitute nearly half of the expenditures for all purposes in a workingman's family. From this study we learn that the retail price of the principal article of food weighted, according to family consumption of the various articles, was 20.6 per cent higher in 1907 than the average price paid for the ten years' period 1890–1899, or 26.3 per cent higher than in 1896, the year of the lowest prices during the same period. Compared with the average for the same year period the purchasing power of an hour's wages in 1907, as measured in the purchase of food, was 6.8 per cent greater than in the decade 1890–1899.

The differences between 1906 and 1907 are set forth as follows: In the year 1907 the average wages per hour in the principal manufacturing and mechanical industries of the country were 3.7 per cent higher than in 1906, and the retail prices of food were 4.2 per cent higher in 1907 than in 1906, indicating that the purchasing power of an hour's wages, as measured by cost of food, was one-half of 1 per cent less in 1907 than in 1906.

Unfortunately all of these valuable data are based upon a study of industries in which skilled, and presumably organized, wage-earners are employed, who, it may be presumed, have insisted upon an equitable basis of wages. The writer fears that the great army of the working classes earning $10 or less a week have not participated to the same extent in the general advance of wages, and yet have had to carry the burden of increased cost of living.

The following table shows the articles for which the price in 1907 was higher than the average price for the decade of 1890–1899, and also the articles for which the price in 1907 was lower during the same period:

Article.	Relative price, 1907.	Article.	Relative price, 1907.
Bread, wheat	104.5	Apples, evaporated	124.6
Vinegar	101.5	Veal	125.0
Tea	105.2	Butter	127.6
Molasses	107.7	Mutton	130.1
Rice	108.5	Pork, salt (ham)	130.7
Beef, salt	114.1	Chicken (year or more old), dressed	131.4
Milk, fresh, unskimmed	116.8	Corn meal	131.6
Flour, wheat	117.7	Lard	134.2
Beans, dry	118.8	Eggs	137.7
Beef, fresh:		Pork:	
Roasts	119.1	Salt, dried, or pickled	142.2
Steaks	120.6	Fresh	142.5
Fish, fresh	120.6	Pork, salt (bacon)	157.3
Potatoes, Irish	120.6	Sugar	99.6
Fish, salt	121.6	Coffee	95.0
Cheese	123.2	Prunes	88.4

It is especially deplorable that there should have been such a marked advance in the necessaries of life, such as meats, beans, potatoes, corn meal, and pork or bacon, which with bread constitute the foundations of a substantial diet for wage-earners.

The bulletin does not take into consideration the items of clothing and dry goods. The cost of clothing, according to a recent report of

the chamber of commerce, since 1900 has advanced 30 per cent, gingham 30 per cent, bleached cotton goods 60 per cent.

The tables on pages 197–200 are also of extreme interest; for instance, the table on page 197, based on the average food cost of 2,567 families, distributed over five geographical divisions in the United States, shows that the average cost of food for each family in 1890 was $318.20. In 1896, the year of lowest prices, it fell to $296.76, since which time it has gradually risen to $374.75 in 1907.

The tables on pages 199 and 200 show the purchasing power of a dollar from 1890 to 1907 of various articles of food of the grade used by the 2,567 workingmen's families. Some of the principal items are here reproduced in a condensed form:

		1890.	1907.
Fresh beef	pounds.	7.81	6.47
Salt beef	do.	10.06	8.59
Fresh pork	do.	9.89	6.73
Fish	do.	10.09	8.53
Eggs	dozen.	5.83	3.39
Milk	quarts.	16.74	14.40
Butter	pounds.	4.23	3.29
Cheese	do.	6.89	5.12
Lard	do.	10.86	7.95
Corn meal	do.	46.57	35.39
Potatoes	bushel.	1.22	1.10

The following table shows the average expenditures of 2,567 workingmen's families for each of the principal items entering into the cost of living, and per cent of average total expenditure in 1901 (expenditure based on all families):

Item of expenditure.	Average.	Per cent of total expenditure.
Food	$326.90	42.54
Rent	99.49	12.95
Mortgage:		
Principal	a 8.15	1.06
Interest	b 3.96	.52
Fuel	32.23	4.19
Lighting	8.15	1.06
Clothing:		
Husband	33.73	4.39
Wife	26.03	3.39
Children	48.06	6.26
Taxes	5.79	.75
Insurance:		
Property	1.53	.20
Life	19.44	2.53
Organizations:		
Labor	3.87	.50
Other	5.16	.67
Religious purposes	7.62	.99
Charity	2.39	.31
Furniture and utensils	26.31	3.42
Books and newspapers	8.35	1.09
Amusements and vacation	12.28	1.60
Intoxicating liquors	12.44	1.62
Tobacco	10.93	1.42
Sickness and death	20.54	2.67
Other purposes	45.13	5.87
	768.54	100.00

a Including interest paid by 13 families.
b Not including interest paid by 13 families, included in principal.

In Bulletin 93 of the Census of Manufactures, 1905, published in May, 1908, we find some interesting data of earnings of wage-workers. The investigation covers 3,297,819 wage-earners, of which 79.4 per cent were men; 17.9 per cent were women, and 2.7 per cent were children. The average weekly earnings of all classes was $10.06. For men 16 years and over it was $11.16; for women $6.17, and for children under 16 years $3.46.

The greatest number of men is reported in the $12 to $15 per week group, and of women in the $6 to $7 group, while the greatest number of children is reported in the group receiving less than $3 a week.

The important fact revealed by these tables is that out of the total number of men included in the statistics 1,215,798, or 46.5 per cent, earned $10 or less a week. It would be extremely interesting to learn how many of this group were married men. At all events the writer believes that an explanation for the large army of women and children engaged in wage-earning occupations may be found in these figures. It is simply impossible for a family of five to maintain a decent standard of living on an income of $10 a week, and hence the wives and children are compelled to participate in the fierce struggle for existence.

COMPENSATION OF GOVERNMENT EMPLOYEES.

Bulletin 94 of the Bureau of the Census, issued April 13, 1908, deals with statistics of 185,874 employees, of which 172,053 were males and 13,821 females. The largest class, viz, 43,790 persons, or 23.6 per cent of the total number, receive from $900 to $1,000 per annum; next in numerical importance is the class earning less than $720 per annum, represented by 35,331 persons or 19 per cent of the total; 11.7 per cent of the total earn $720, but less than $840 a year; 5.7 per cent earn between $840 and $900, and 18.4 per cent earn $1,000 but less than $1,200 a year.

The approximate average compensation is $948. Of the employees under 20 years of age, 71.2 per cent are paid at a rate of less than $720 and 13.6 per cent at a rate of $900, but less than $1,000, making a total in these two classes of 84.8 per cent.

Of the 25,351 Government employees residing in the District of Columbia, 12,901, or about one-half of the total, are married. The following shows the number of married employees in different salary groups:

Compensation.	Total employees	Married employees.
Less than $720	6,501	2,028
$720, but less than $840	2,236	1,267
$840, but less than $900	602	327
$900, but less than $1,000	1,516	583
$1,000, but less than $1,200	2,458	1,113
$1,200, but less than $1,400	4,537	2,514
$1,400, but less than $1,600	2,469	1,552
$1,600, but less than $1,800	1,361	949
$1,800, but less than $2,000	1,158	906
$2,000, but less than $2,500	841	681
$2,500, and over	617	504
By piecework	1,046	498

Since the bulletin contained no specific data on the question of the exact earnings of married men earning less than $720 a year, inquiries on this point were addressed to the departments, and the following table shows the number of married men employed in the respective departments and the wage groups:[a]

	Salary $600 to $700.	Salary $500 to $600.	Salary below $500.
Department of Agriculture	90	47	48
Treasury Department	188	116	2
Department of the Interior	205	19	14
Department of Commerce and Labor	42	3	.....
War Department	122	.....	1
Navy Department	54	.....	2
Postmaster-General	51	8	.....
Department of the Interior	6	.....	.....
Department of State	.....	3	.....
Interstate Commerce Commission	13	.....	.....
	771	195	67

From this table it appears that there are 1,033 married men in the Government employ in this city earning less than $660 a year, 262 of whom receive $600 a year or less.

In addition to the foregoing, according to information kindly furnished by Commisisoner West, and the disbursing officer, Mr. Wilson, there are 515 married employees in the District government earning less than $500 a year; 450 married employees earning between $500 and $600, and 251 married employees earning between $600 and $720 a year.

A general survey of the situation justifies the conclusion that the cost of living has far outstripped the present rates of wages of men earning less than $720 a year and of salaried employees in general. This can only be remedied by an increase in wages or a decided decrease in the cost of the necessities of life. Since the latter is beyond the general control of wage-earners, except in so far as increased wages affect the cost of the products of labor, an increase in earnings amounting to at least 25 per cent appears urgently called for.

No effort should be spared to improve the standards of living of poorly paid wage-workers, especially of married men earning less than $2 a day. Justice likewise demands an increase of 25 per cent in the pay of salaried employees, especially where no such increase has been made during the past ten years, in order to compensate for the increased cost of living.

It has come to the knowledge of the committee that a large number of employees in the navy-yard who have purchased homes and own an equity in the property, are likely to suffer financial losses should the intentions of the department to have the work done elsewhere and reduce the number of employees here be carried out. This should be avoided, if possible, on account of the evident hardships involved. It is believed that the best interests of the service and of wage-workers would be subserved if a reasonable assurance of permanent employment could be given.

[a] This does not include employees in the Government Printing Office and Navy-Yard.

In the sociological study of our least resourceful neighbors we find ample food for reflection. We encounter families who, although the husband earns $2.50 a day when he works, are on the borderland of dependency, because he takes three drinks of whisky a day at 5 cents each and consumes 25 cents' worth over Sunday, which means not only an expenditure of $59.80 a year for drink, but also considerable loss of work on account of preventable illness.

While the conditions as a whole in our family groups whose income is less than $700 a year indicate a fierce struggle for existence, some splendid examples of neat and healthful homes, of thrift and happiness, could be cited for the emulation of less competent neighbors. The explanation is to be found in the fact that the parents lead a strictly temperate life, the mother is a good home maker and anxious to better the future of her children, and her spirit of economy, thrift, and ambition animates every member of the household. These principles should be inculcated into the minds of every child. An attempt has been made in several cities to introduce the Provident Stamp Saving System into the public schools. There can be no question that all such efforts, and the establishment of postal savings banks, would stimulate provident habits. If it is possible for the agents and friendly visitors of the Associated Charities to collect over $12,000 a year in this city from the least resourceful people as stamp savings deposits for emergency purposes, there is no good reason why the great army of better paid wage-earners, including salaried employees, should not cultivate similar habits of thrift and economy. While it is true that a goodly number have established their homes and are gradually paying for them, it is equally true that in these days of inordinate desire for pleasure, dress and social rivalry, a very discreditable number live wholly beyond their income and sooner or later fall into the hands of the "loan and salary sharks."

CHAPTER XIV.

SUPPRESSION OF USURY IN THE DISTRICT OF COLUMBIA.

[By GEO. M. KOBER, M. D.]

INTRODUCTION.

In view of the great number of cases of exorbitant rates of interest charged by salary and loan sharks which have come under the notice of the writer in connection with the Associated Charities, and also in our sociological study of families, it was deemed desirable to secure additional information on the subject with a view of formulating suitable recommendations for the suppression of the evil. Mr. Charles F. Weller, of the Associated Charities, and Mr. George S. Wilson, of the Board of Charities, referred in their discussion of the subject to the efforts of the "Society for Savings" to bring about a more tolerable state of affairs. In a number of interviews with officers of that society it was learned that they had entered the field, for which there was an urgent need, with the hope of ameliorating the condition of a large number of government employees by offering a

better service at a reasonable price. The society found itself handicapped, however, by engaging in a business which can not be carried on at the present legal rate of interest (6 per cent), and also because good citizens do not care to invest funds which are loaned in violation of the law. The officers, anxious to extend the usefulness of the society, and at the same time to conduct a strictly legitimate business, have made a careful study of the remedial legislation in other States, with a view of promoting similar legislation in the District of Columbia.

The principles embodied in modern legislation of this class are based upon the theory that money-lending concerns are a necessity; that small loans of this character can not be made at a less rate of interest than 2 to 3 per cent a month during the first year of the loan; that legalization of such rates will attract the capital of reputable citizens and stimulate wholesome competition, which will ultimately result in the reduction of the interest rate to about 1 per cent per month. From the experience of the Provident Loan Society, of New York, conceived and managed as a true business philanthropy, it is apparent that a business in small loans can not be now conducted, except as a purely charitable proposition, at less than 1 per cent per month.

This subject is one of great importance to a very large number of officials and employees of the government and of wage-earners in general. The writer therefore requested Mr. J. T. Exnicios, the manager and treasurer of the Society for Savings, to present the result of his study of existing conditions in this city, and of the most enlightened legislation which has been enacted in Massachusetts, New York, and elsewhere to safeguard this unfortunate class of borrowers against the vicious practices employed by unscrupulous concerns. This he has done in a very satisfactory and comprehensive manner. From a careful study of existing evils the writer feels convinced that the bill framed by the commissioners, and known as H. R. 11772 and S. 2296 will, if enacted with a few minor amendments, have a most salutary effect. The amendments suggested by Mr. Exnicios are in line with legislation in other States. One of these is the reduction of a license tax from $1,000 to $100 per annum. The tax in Massachusetts is only $50 a year, but the law requires that all examinations of the affairs of such concerns made by the bank commissioners of the State shall be at their expense. New York, Rhode Island, and Maryland require no license tax.

It is very evident that all such charges are placed by indirection on the borrower. For this reason, no doubt, the recorders' fee on chattle mortgages in Massachusetts is only 75 cents, and no notarial certificate is required on this class of mortgages, while the charges in this jurisdiction amount to $2.85, which greatly increases the cost of small loans.

The provisions of the bill, on the whole, are excellent. Sections 4 and 5 are especially commendable, as they require a register to be kept of all loans and transactions, subject to official inspection. The execution of such a law, in order to safeguard against abuses, requires careful official supervision, such as contemplated by the recommendations to the President, April 29, 1907, of Mr. James B. Reynolds, in the creation of a bureau of labor.

THE USURY EVIL IN THE CITY OF WASHINGTON.

[By J. T. Exnicios.]

I. THE MONEY BORROWER.

In the city of Washington there is a very large number of persons who are unable to secure loans from banks, trust companies, or real-estate brokers, because having nothing in the form of assets except their labor or earning capacity to offer as security, or possibly household effects, and perhaps jewelry. These people might be divided into three classes or groups:

First, the government clerks and employees, who can offer nothing as security for money but their individual notes secured by the indorsement of their fellow-clerks.

Second, that class of persons who, for various reasons, do not care to have their needs made known to their friends on account of their standing in the community, and offer as security for money obtained their jewelry or other personal effects, and who, while possessing homes and furniture, hesitate to give a chattel mortgage on their household furniture because of the publicity attendant upon the recording of such mortgages.

Third, that very large class of people who, not having steady employment or regular sources of income, and who, usually on account of the small wages earned, and having large families depending upon them, are unable to lay aside any savings to meet emergencies, are compelled to mortgage their household effects; and as such people nearly always need money, and emergencies arise when they must have it quickly, they instinctively turn to the only source open to them, the loan shark.

The money lender exists here because he is needed and renders an indispensable service to those whose living depends on the workshop, the office, the city, or the National Government, where men and women are earning salaries and wages. Salary earners are a never-failing source of income and support to him. He is particularly active among clerks in every department and bureau of our Government; among school teachers, firemen, policemen, and other city employees, the newspaper office and the railroad office, but more especially among the laboring class, where he not only trades and fattens on their necessities but on their ignorance.

The cruel part of the whole system is the pettiness of the loans made to the laboring class. The loan seldom exceeds $25, and the need arises from sickness or trouble in the workman's family. His pay is small, just enough to live on; he may be going through that period in the life of a family when children are born, or when they are being educated, the expenses come closer to the danger line. Wife or child may fall ill and an extra outlay has to be met; other expenses, such as rent or grocery accounts, get behind, creditors begin to press, the man is worried and miserable, and seeks relief from the only source at his command, the loan shark, whose advertisement offers money an easy payments and long time. He calls on the advertiser, anxious, flustered, disheartened; is received cordially, and assured suavely that such difficulties are common and of daily occurrence; told to call again; his record is investigated meanwhile and

his household furniture appraised. On his return he secures the small sum needed, signs some papers "as a matter of form," and is tied hand and foot for perhaps years. Very few attempt to evade these obligations, and as a consequence the loan sharks have very few occasions for bringing suit to enforce payment of these loans to the last penny. He indulges in threats, but rarely executes them, for his great dread is publicity.

II. THE MONEY LENDERS AND THEIR METHODS.

There are many money lenders and money-lending concerns in Washington (about 72), with an invested capital of approximately a million dollars, loaning money at exorbitant rates of interest upon mortgages of furniture and household effects, other personal property, and indorsed notes. The rate of interest charged varies very much; often the rate is as low as 10 per cent per month; sometimes as high as 25 per cent, and occasionally even a higher rate of interest is exacted. The following are a few of the many advertisements which can be found in our daily papers:

Potomac Guarantee Loan Company, 925 F street N. W.

$10 for one month costs $0.60 (or 72 per cent per annum).
$20 for one month costs $1.05 (or 63 per cent per annum).
$30 for one month costs $1.45 (or 58 per cent per annum).
We also make a small charge for appraising property, etc.

Union Loan and Trust Company, 810 F street NW.

$10 for one month costs $1.50 (or 180 per cent per annum).
$20 for one month costs $2.25 (or 135 per cent per annum).
$25 for one month costs $2.50 (or 120 per cent per annum).

Mutual Loan and Trust Company, 913 G street NW.

35 cents a week pays interest and principal on a $10 loan.
50 cents a week pays interest and principal on a $15 loan.
75 cents a week pays interest and principal on a $20 loan.
90 cents a week pays interest and principal on a $25 loan.
$1.50 a week pays interest and principal on a $50 loan.
$2.75 a week pays interest and principal on a $100 loan.

Now, these sums are paid by the borrower for a period of fifty-two weeks, hence the cost of $10 is $8.20, or 161 per cent per annum; $15 is $11, or 140 per cent per anuum; $20 is $19, or 180 per cent per annum; $25 is $21.80, or 171 per cent per annum; $50 is $28, or 109 per cent per annum; $100 is $43, or 83 per cent per annum.

The Surety Loan Company, Ninth and F streets NW., whose charges are on $10 for one month, $1; on $15 for one month, $1.50; on $20 for one month, $2. That is 10 per cent per month, or 120 per cent per annum. "No more, no less," to quote their advertisement. Added to these various rates are the charges for notary fees, recording mortgages, etc., running from $3 to $10.

Borrowers in many instances pay this heavy interest for months, and even for years, without decreasing the amount of the original debt, and often lose the property mortgaged by them, even when they have paid the amount of the principal borrowed with lawful interest, for under such rates a borrower can seldom pay up the principal of

his loan, but goes on, year after year, paying this heavy interest, often in the end to have all he possessed taken from him when the lender demands his principal.

Some of these concerns operate two or three companies, located at different addresses and under different names, and incidentally suggest to the borrower that, being unable to loan more than a part of the sum desired, they might succeed in securing the additional amount by applying to ———, furnishing the address of one of the other offices, when, after paying over again the usual charges for recording, notary fee, appraisement, etc., the borrower receives the amount necessary to make up the original sum asked for. We have in mind a particular case where the sum required was $30 on furniture. After going to three of these (allied) concerns the borrower secured the amount, $10 at each place and paid the regular fees at each place.

At a hearing before the subcommittee on judiciary of the Committee on the District of Columbia, United States Senate, May 6, 1908, on various bills introduced for the suppression of usury in the District of Columbia the testimony of Senator Gallinger, Commissioner Macfarland, and Mrs. Charlotte Everett Hopkins all point to the grossest forms of abuses and exorbitant rates of interest which, in the opinion of Senator Gallinger, "no community ought to permit anyone to exact from poor people."

All the cases cited differ only in degree, not in kind, and how many of them there are in any one year no one can ever tell, but there are thousands of loans made annually, and as the profits must be enormous the suffering entailed must be in due proportion. These conditions have continued for a number of years and naturally have grown worse, and though staggering and almost incredible they are borne out by facts on record.

The foregoing statement also covers fully the abuses that were wont to exist in the States of New York, Massachusetts, Rhode Island, and Maryland until public opinion through the legislatures of these States enacted laws which put a stop to the evil practice.

III. MEANS OF PREVENTION TRIED IN WASHINGTON SINCE 1905.

In January, 1905, there was incorporated in this city the Society for Savings of Washington, modeled after similar concerns in a number of the States, for the purpose, among others, of lending money to deserving persons on indorsed notes. It was never for a moment contemplated that the new venture should be in any sense a charity; in fact, it was realized that to lend money as a work of charity would fail to reach the very class of persons whom it was desired to afford a means of relieving a temporary embarrassment, namely, persons who, while not able to obtain loans from banks, trust companies, or real estate brokers, are able and willing to pay reasonably for the accommodation.

The capital stock was fixed at $50,000, most of which is now paid in. In the beginning, after considerable effort, a sum of about $7,500 was raised and operations were started. The loans made were necessarily small, averaging $25, and never exceeding $50, to any one person upon indorsed notes and confined almost exclusively to clerks in the various Government departments, and at a rate of interest of 8

per cent per month. After the first year, and upon increasing the capital employed, the rate was reduced to 2½ per cent per month, and is now 2 per cent per month, with a small charge according to the amount loaned, in some cases 25 cents, as upon a $25 loan, which costs 75 cents for one month, but never exceeding $3 in any one year, and this latter sum is charged only when loans are made on household goods (including charges of every character, among which is $2.35, the actual fee for court recording, and 50 cents for notary fee, or $2.85), which feature of the business was adopted about the beginning of this year. In some very deserving cases a charge of 1½ per cent per month has been made, and only one-half per cent a month in one case, that of a young man, a messenger in one of the departments, who became deeply involved with a number of money lenders to the extent of about $500. * * *

Much good, it is believed, has been done by this society, and a great deal more could be done were it possible to secure the funds needed; but its business being what may be termed "outlawed," the directors have labored under a handicap that is almost disheartening.

Small sums of money can not be loaned at the legal rate of interest (6 per cent), pay operating expenses, no matter how economically the business is conducted, stand the inevitable losses through uncollectible notes, and pay a fair dividend on the capital invested. This has been demonstrated time and again in every State of the Union and in foreign countries as well. If there could be any doubt of the correctness of this statement, legislation which has been enacted in many of the States will prove its truth. This legislation will be more particularly referred to further on.

IV. REMEDY PROPOSED.

The most effective way to get rid of the loan and salary shark is to meet him on his own ground. Legislation will not kill him. In trying to exterminate him legislation is apt to abolish the service and furnish nothing to replace it.

The logical way to get rid of him is to supply a better service at reasonable rates. Along this line some very effective work is now being done under protection of the law in other cities and could be done here by the enactment of a suitable bill, which has been drafted by the District Commissioners and is known as S. 2296 and H. R. 11772. Under its provisions the business will become legalized, the stigma which now attaches to those carrying on a business not strictly lawful would be wiped out, and a better class of our citizens would engage therein, more capital would be attracted, and there would be more competition, with the consequent lowering of the interest charged and a resulting benefit to the borrower and the community.

A BILL To regulate the business of loaning money on security of any kind by persons, firms, and corporations other than national banks, savings banks, and trust companies and real-estate brokers in the District of Columbia.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That hereafter it shall be unlawful and illegal to engage in the business of loaning money on any security of any kind, direct or collateral, tangible or intangible, without procuring license; and all persons, firms, joint-stock companies, voluntary associations, and corporations engaged in said business shall pay a license tax of one thousand dollars per annum to the District of Columbia.

SEC. 2. That applications for licenses to conduct such business must be made in writing to the Commissioners of the District of Columbia, and shall contain the full names of applicants, if natural persons, and the full names of the officers and directors, by whatever name known, of corporations, companies, and associations, the addresses of all persons named therein and the place where such business is to be conducted, and such other information as the said commissioners may require. Every license granted shall date from the first of the month in which it is issued and expire on the thirty-first day of the following October. Every application shall be filed not less than one week prior to the granting of such license, and notice of the filing of such application shall be posted in the office of the assessor of the said District. Protests may be made by any person to the issuing of such license, and when such protests are filed with the said commissioners the latter shall give public notice of and hold a public hearing upon such protests before issuing such license. The said commissioners shall have power to reject any application for license for failure to observe this act, and for such failure to suspend or revoke any such license for cause shown, after notice and hearing.

SEC. 3. That each application shall be accompanied by a bond to the District of Columbia in the penal sum of five thousand dollars, with two or more sufficient sureties, and conditioned that the obligor will not violate any law relating to such business. The execution of any such bond by a fidelity or surety company authorized by the laws of the United States to transact business therein shall be equivalent to the execution thereof by two sureties, and such company, if excepted to, shall justify in the manner required by law of fidelity and surety companies. If any person shall be aggrieved by the misconduct of any such licensed person, firm, corporation, company, or association, and shall recover a judgment therefor, such person may, after a return unsatisfied either in whole or in any part of any execution issued upon such judgment, maintain an action in his own name upon such bond herein required in any court having jurisdiction of the amount claimed. The Commissioners of the District of Columbia shall furnish to anyone applying therefor a certified copy of any such bond filed with them upon the payment of a fee of twenty-five cents, and such certified copy shall be prima facie evidence in any court that such bond was duly executed and delivered by the person, firm, corporation, company, or association whose names appear thereon.

SEC. 4. That every person, firm, corporation, company, or association conducting such business shall keep a register, approved by said commissioners, showing, in English, the amount of money loaned, the date when loaned and when due, the person to whom loaned, the property or thing named as security for the loan, where the same is located and in whose possession, the amount of interest, all fees, commissions, and renewals charged, under whatever name. Such register shall be open for inspection to the said commissioners, their officers and agents, on every day, except Sundays and legal holidays, between the hours of nine o'clock in the forenoon and five o'clock in the afternoon.

SEC. 5. That no such person, firm, corporation, company, or association shall charge or receive a greater rate of interest or discount upon any loan made by him or it than two per centum per month and a sum not exceeding three dollars for the first examination of the property to be mortgaged, or the investigation of the credit or responsibility of indorsers or sureties when an indorsed note is taken as security, and for drawing the necessary papers, which charge shall include all services of every character in connection with the loan, except upon the foreclosure of the security, and no additional sums, either in the way of bonus or otherwise, shall be required or exacted of borrowers; nor shall it be lawful to divide or split up loans under any pretext whatsoever for the purpose of requiring or exacting any other or greater charge than herein prescribed. The foregoing interest and charge may be deducted from the principal of the loan when the same is made. No such loan greater than five hundred dollars shall be made to any one person.

SEC. 6. That the enforcement of this act shall be intrusted to the Commissioners of the District of Columbia. Complaints against any licensee or applicant shall be made in writing to the said commissioners, and reasonable notice thereof, not less than one day, shall be given to said licensee or applicant by serving upon him a concise statement of the facts constituting the complaint, and a hearing shall be had before the said commissioners within one week from the date of the filing of the complaint, and no adjournment shall be taken for longer than one week. A daily calendar shall be kept of all hearings by the said commissioners, which shall be posted in a conspicuous place in their

public office for at least one day before the date of such hearings. The said commissioners shall render their decision within eight days from the time the matter is finally submitted to them. Said commissioners shall keep a record of all such complaints and hearings, and may refuse to issue and shall revoke any license for any good cause shown, within the meaning and purpose of this act; and when it is shown to their satisfaction that any license or applicant under this act, either before or after conviction, is guilty of any conduct in violation of this law, it shall be the duty of the said commissioners to revoke or reject the license of such licensee or applicant, but notice of the charges preferred shall be presented and reasonable opportunity shall be given said licensee or applicant to be heard in his defense. Whenever for any cause such license is revoked, said commissioners shall not issue another license to said licensee until the expiration of at least six months from the date of revocation of such license.

SEC. 7. That any violation of this act shall be punished by a fine of not less than five dollars and not greater than two hundred dollars. The said commissioners shall cause the corporation counsel to institute criminal proceedings for the enforcement of this act before any court of competent jurisdiction.

SEC. 8. That nothing contained in this act shall be held to apply to the legitimate business of institutions which are members of the Bankers' Association of the District of Columbia, building and loan associations, or to the business of pawnbrokers or real-estate brokers, as defined in the act of Congress of July first, nineteen hundred and two.

SEC. 9. That the Commissioners of the District of Columbia are hereby authorized and empowered to make all rules and regulations necessary in their judgment for the conduct of the said business and the enforcement of this act in addition hereto and not inconsistent herewith.

SEC. 10. That all acts and parts of acts inconsistent herewith are hereby repealed.

SEC. 11. That this act shall take effect from and after its passage.

V. AMENDMENTS PROPOSED AND APPROVAL OF THE BILL.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That hereafter it shall be unlawful and illegal to engage in the business of lending money on any security of any kind, direct or collateral, tangible or intangible, without procuring license, and all persons, firms, joint-stock companies, voluntary associations, and corporations engaged in said business shall pay a license tax of one thousand dollars per annum to the District of Columbia.

First, amend this section by inserting after the word "money," in line 4, the words "upon which a rate of interest greater than 6 per cent per annum is charged," so that it shall read: "The business of loaning money, upon which a rate of interest greater than 6 per cent per annum is charged," etc.

Second, substitute "one hundred" for "one thousand," in line 8, so that it shall read: "Business shall pay a license tax of one hundred dollars per," etc.

Reasons.—All States which now have laws governing the loaning of money specifically state in the acts that all persons, firms, etc., loaning money at more than the legal rate of interest, etc., which shows that the provision has been carefully looked into and deemed necessary. It might be said in this connection that Senator Johnston and Hon. J. M. Thurston stated they "thought it might be a wise provision," at the hearing before the subcommittee on judiciary of the Committee on the District of Columbia, May 6, 1908, at which the former was present as a member of said committee, and the latter as attorney representing some money lenders.

As to the amount of license tax, the State of Massachusetts exacts a tax of only $50 per year, but requires that all examinations of the affairs of these concerns made by the bank commissioners of the State

shall be at their expense. The State of New York does not require a license, nor does the State of Rhode Island, nor the State of Maryland.

That $1,000 per annum should not be exacted as a license charge or tax seems to require no argument. It would be wringing from the lenders a sum which is much too large, and would hold an inducement for some of them to place this charge by indirection on the borrower. Further, Commissioner West states: "Though this tax of $1,000 was inserted, they were not insisting upon that amount, and it might well be reduced." (Senate hearing, May 6, 1908, p. 21.)

Section 2: This section is in line with the practice and laws in force in States hereinbefore mentioned.

Section 3: Same reason as applied to section 2.

Section 6: Same as section 2.

Sections 9, 10, and 11: Same as section 2.

SEC. 4. That every person, firm, corporation, company, or association conducting such business shall keep a register approved by said commissioners, showing in English the amount of money loaned, the date when loaned, and when due, the person to whom loaned, the property or thing named as security for the loan, where the same is located, and in whose possession, the amount of interest, all fees, commissions, and renewals charged, under whatever name. Such register shall be open for inspection to the said commissioners, their officers and agents, on every day, except Sunday and legal holidays, between the hours of nine o'clock in the forenoon and five o'clock in the afternoon.

The only way to regulate this business is through publicity, for laws, no matter how drastic their provisions, can and will be evaded; but when the people who carry on this business are compelled to lay bare to the proper officials each and every transaction they have engaged in, you then strike at the root of the evil, and are in a position to apply the needed remedy. It has been stated that this section is impracticable, or, if practicable, it would involve considerable expense and labor. We deny this for the reason that now, and for many months past, the Society for Savings has in daily use such a register, and after experience feels that it is the only method whereby it can be seen at a glance that charges have been paid by the borrower, and for what purposes. We think, though, this section would be strengthened were it amended so as to require an annual statement in the form of a trial balance of its books, on the 31st day of December in each year, specifying the different kinds of its liabilities and the different kinds of its assets, stating the amount of each, together with such other information as may be called for. This statement should be furnished to the District Commissioners on or before the 20th day of January in each year by each individual or company engaged in this business, and they should also print this statement or trial balance in at least one newspaper of general circulation in Washington, in such manner as may be directed by the District Commissioners.

Inspection by state officials designated by law and annual reports of the business are required in New York, Massachusetts, and Rhode Island, likewise the publishing of annual reports.

SEC. 5. That no such person, firm, corporation, company, or association shall charge or receive a greater rate of interest or discount upon any loan made by him or it than two per centum per month, and a sum not exceeding three dollars for the first examination of the property to be mortgaged, or the investigation of the credit or responsibility of indorsers or sureties when an indorsed note is taken as security, and for drawing the necessary papers, which charge shall include all services of every character in connection with the loan, except

upon the foreclosure of the security, and no additional sums, either in the way of bonus or otherwise, shall be required or exacted of borrowers; nor shall it be lawful to divide or split up loans under any pretext whatsoever for the purpose of requiring or exacting any other or greater charge than herein prescribed. The foregoing interest and charge may be deducted from the principal of the loan when the same is made. No such loan greater than five hundred dollars shall be made to any one person.

The provisions of section 5 restricting the amount of such loans and legalizing a rate of interest not higher than 2 per cent per month, and a fixed charge not in excess of $3 for examining the property to be mortgaged and drawing the necessary papers, are taken from the acts of State legislatures, which will be now noticed at some length, as also will be the business of some of the corporations operating under them.

By the laws of the State of New York, chapter 326, Laws of 1895, as amended by chapter 706, Laws of 1895, entitled "An act to provide for the incorporation of associations lending money on personal property, and to forbid certain loans of money, property, or credit," it is provided:

SEC. 3. * * * It [every such corporation] shall be entitled to charge and receive upon such loan made by it without the actual delivery to it of the property pledged or mortgaged, which charge shall include all services of every character, in connection with said loan, except upon the foreclosure of the security, interest or discount at a rate of not exceeding three per centum per month for a period of two months or less, and not exceeding two per centum per month for any period after said two months; and also a sum not exceeding three dollars for the first examination of the property to be pledged or mortgaged and for drawing and filing the necessary papers.

It will be observed that section 5 of the proposed bill is copied substantially from this law.

VI. METHODS IN FORCE IN NEW YORK, MASSACHUSETTS, RHODE ISLAND, AND MARYLAND.

The laws of the above-named States will now be noticed at some length, as will be also the business of some of the corporations operating under them.

New York.—The Provident Loan Society of New York was organized under chapter 295 of the Laws of 1894. The New York legislature granted a special charter to carry on this business to Otto T. Bannard, Charles C. Beaumen, Henry R. Beekman, William L. Bull, Frederic R. Coudert, Charles F. Cox, John D. Crimmins, R. Fulton Cutting, Robert W. de Forest, William E. Dodge, Charles S. Fairchild, David H. Greer, Abram S. Hewitt, James J. Higginson, Adrian Iselin, jr., D. Willis James, John S. Kennedy, Seth Low, Solomon Loeb, Alfred B. Mason, Victor Morawetz, J. Pierpont Morgan, Oswald Ottendorfer, Jacob H. Schiff, Gustave H. Schwab, Charles S. Smith, James Speyer, Walter Stanton, J. Kennedy Tod, Abraham Wolff, and Cornelius Vanderbilt, together with such persons as they may associate with themselves. These gentlemen are among the most prominent and substantial in the city of New York. Section 3 of said act reads as follows:

Said society shall be entitled to act as pawnbroker, and shall be subject to and entitled to all the benefits of all the provisions of the laws of this State concerning pawnbrokers, except that it shall not be required to obtain a license or file a bond.

This society is allowed under the law to charge interest at the rate of not exceeding 3 per cent per month, and, notwithstanding its stupendous capital and the fact that it is classed as a benevolent society, it actually charges as interest on all loans made 1 per cent per month. From the thirteenth annual report of said society, for the year 1907, it appears that the capital employed at the close of the year 1907 was $5,001,586.14, that the amount loaned during said year was $10,601,000, and that the average single loan was $37.46. On page 11 of the report of 1905, in advocating making pawn offices accessible to the working classes, this statement will be found:

The need of the working classes, who form the great army of borrowers, can best be met by making the pawn office accessible to them. Convenience of access is even more important than a low rate of interest. This is evidenced by the great growth of our own Eldridge street branch, on the East Side, where the transactions already largely exceed those of the Fourth avenue office. It is also evidenced by the fact that many prefer to patronize an adjacent pawnbroker whose rate of interest is much higher than that charged by this society rather than go a little out of their way to one of our offices. The benevolent purpose of the society will be far better effectuated by an increase in the number of our branches than by any lowering of the rate of interest, even if such a course were otherwise desirable. Most loans are, or are intended to be, for a short period when made. Car fares and loss of time count for more than a higher interest charge.

Could there possibly be any stronger argument as to the necessity for legalizing a reasonable rate of interest on such loans than the operations of this society? It has a vast capital, most of it made up by gifts or bequests and contributions from the rich, and is operated not primarily for profit, and yet it actually charges 1 per cent per month on its loans and is allowed by law to charge 3 per cent per month.

The report of the president for 1907 shows that—

In 1895, our first full year, we had one small loaning office, which made 20,804 loans, amounting to $377,845; in 1907, with six loaning offices in operation, 283,045 loans, amounting to $10,601,557, were made. In 1895, 18,214 loans, amounting to $322,506, were repaid, whereas in 1907 the number was 254,063, amounting to $9,840,379. Again, the interest earnings, amounting in 1895 to $23,847, reached in 1907, the large sum of $564,534. The enormous attention to detail involved in the successful conduct of this business becomes apparent when one considers that the average of the loans made in 1907 was $37.46.

The same comparison holds good as to the personnel and organization of the society. From a rented office with a staff of four or five people, employing $100,000 capital, it has become a great fiscal institution of $5,000,000 capital, a large, well-trained staff of about sixty employees, with six offices. * * *

Of course, everyone will realize that the smaller the loan on personal property the less the margin of profit, as the percentage of operating expenses is proportionately larger when a small loan is made than when made in large amounts. The executive committee decided that on November 1, 1907, in view of the increased cost of capital and the greater cost of handling an increasing volume of small loans (192,060 being for $25 and under, 91,754 being for $10 and under, and 44,450 being for sums of $25 to $50) all renewals, as well as all new loans, should be at the interest rate of 1 per cent per month or fraction thereof, except those repaid within two weeks from date of making, when one-half per cent only would be charged.

Mr. Frank Tucker, the vice-president and executive officer, at a conference held with a committee of our Society for Savings of Washington, in July, 1908, stated that the handling of small loans at 1 per cent per month was purely a charitable proposition and so

regarded by his society, but an absolute impossibility to any concern with a smaller capital, and submitted the following figures as proof:

Number of loans made 1907, 283,045.
Operating expenses, excluding dividends, $127,052.62, or a cost per loan of 45 cents.
Cost of $10 loan to society, 45 cents.
Dividend of 6 per cent per annum on $10, 60 cents.
A loan of $10 cost the society for one year, $1.05.
Ten dollars at 1 per cent per month earns the society for one year $1.20, or a loan of $10 for the first nine months merely earned its cost of handling, but that 2 per cent per month was more reasonable and a fair business proposition.

The Provident Loan Company, of Buffalo, was incorporated under the aforementioned act, and a reading of the annual reports of said company and of the other companies or societies hereinafter mentioned will be interesting to those who care to investigate further into this matter. The rate of interest charged by the Provident Loan Company, of Buffalo, is 3 per cent per month for the first month, and 2 per cent for each month thereafter, and a charge of $3 for examination of property and recording of mortgages, etc., the rate allowed by law. It is said in one of the annual reports of this company that "its purpose is the same as that of the Workingmen's Loan Association, of Boston, founded by Robert Treat Paine in 1887, and its methods of business are closely patterned after those in use by that association." (See First Annual Report, September 9, 1895, to September 30, 1896.) The Workingmen's Loan Association, of Boston, was one of the pioneers in this line of business. The law under which it was incorporated and its operations will be alluded to further on.

Massachusetts.—By an act of the legislature of the State of Massachusetts entitled "An act to incorporate the Pawner's Bank," approved April 5, 1859, it is provided by section 4 that—

The charge on all loans to cover expenses of every kind, including interest, shall be uniform, and not to exceed one and one-half per cent per month.

This act was amended by an act entitled "An act to amend the charter of the Pawner's Bank of Boston," approved June 21, 1869. Section 2 thereof reads as follows:

The charge on loans, to cover expenses of every kind, including interest, need not be uniform, but may be regulated by the bank, but it shall in no case exceed two per cent per month.

This so-called bank is still in business, but it is now operated under the name of the Collateral Loan Company of Boston. The total amount of the loans made by it for the year 1905 amounted to $2,092,566.08. The average single loan was $22.78.

The Workingmen's Loan Association of Boston was incorporated by an act of the legislature of Massachusetts approved March 8, 1888, entitled "An act to incorporate the Workingmen's Loan Association." By this act a charter was granted to Robert Treat Paine, Charles W. Dexter, John S. Blatchford, Francis C. Foster, John D. W. French, I. Wells Clarke, George W. Pope, Charles H. Washburn, Robert Treat Paine, second, Thomas T. Stokes, and Henry R. Gardner, and their associates and successors. The association was authorized to loan money upon pledge or mortgage of goods and chattels, and on safe securities of every kind, or upon mortgage of

real estate. The capital stock of the association is $125,000. The amount of outstanding loans on April 1, 1908, was $215,826.64, the number of borrowers was 3,585, and the average single loan was about $60. (See the Twentieth Annual Report of the Workingmen's Loan Association, dated April 16, 1908.) In a pamphlet published by the Massachusetts board of managers, World's Fair, in 1893, entitled "Origin and system of the Workingmen's Loan Association," on page 5 appears the following statement:

> The charge for interest is 1 per cent per month. An additional charge is made on the making of each loan sufficient to cover all money expended in investigation and recording the mortgage, and to give the company in ordinary cases $1.05 for the time spent in appraisal and drawing papers. Nearly all of the loans of the company are made on chattel mortgage of furniture and household effects.

This has been amended, and at the present time, October, 1908, the association, in addition to its regular rate of 1 per cent per month, charges for investigation, recording of mortgages, etc., the sum of $2.50 on loans under $50, $3 on loans of $50 to $250, and $5 on loans over $250; $1 is the cost charged for renewals. No loan is made for less than $25 on account of the cost of handling, which amounts to $3.77, although the cost of recording chattel mortgages in Massachusetts is but 75 cents, and no notarial certificate is required on this class of mortgages.

The association also charges 25 cents on loans under $50, and 50 cents on loans from $50 to $100, to compensate the association for the risk of loss of goods mortgaged, by fire, though no insurance policy is taken out on the goods mortgaged as security for such small loans. Thus it will be seen that the association receives interest on its ordinary small loans for short periods of time of at least 2 per cent per month, and sometimes more. Robert Treat Paine, of Boston, a gentleman of national reputation, was the first president of this association, and he has been continuously reelected to the same office to the present time.

In 1908 the legislature passed an act entitled "An act to regulate further the business of making small loans" (chap. 605, 1908), which act confers on the police commissioner of Boston, and upon the mayor in other cities, the power to make the rate of interest to be charged upon small loans of $200 or less, upon which a rate of interest greater than 12 per cent per annum is charged, and for which no security, other than a note or contract with or without indorsers is taken, having due regard to the amount of the loan and the time for which it is made.

It also fixed the charges or cost as follows:

> SEC. 3. * * * An amount not exceeding $2 if the loan does not exceed $25; not exceeding $10 if the loan exceeds $100; not exceeding $3 if the loan exceeds $25 but does not exceed $50; and not exceeding $5 if the loan exceeds $50 but does not exceed $100, may, if both parties to the loan so agree, be paid by the borrower or added to the debt, and taken by the lender as the expense of making the loan, and such amount shall not be counted as part of the interest on the loan. A greater amount than that above specified shall not be taken for such purpose, and any money paid, promised, or taken in excess of such amount shall be deemed to be interest.

Under the power conferred on the police commissioner of Boston to make the rate of interest that may be charged on said class of small

loans, for which no security is taken other than a note or contract with or without indorser, he has made the following rates:

SEC. 8. Interest may be charged by persons licensed under this rule as follows:

On loans not exceeding $50, at the rate of 36 per cent per annum; on loans of over $50, at the rate of 30 per cent per annum.

The license tax for this class of business is $50 per annum.

Rhode Island.—By an act of the general assembly of the State of Rhode Island, passed February 28, 1895, entitled "An act to incorporate the Workingmen's Loan Association," it is provided that the rate of interest on loans to be made by said association "shall not exceed 1 per cent a month." (See sec. 4 of said act.) This act was amended on May 27, 1897, and the rate of interest on such loans was raised not to exceed 2 per cent per month, which rate is still in force. Section 4 of said act as amended reads as follows:

All loans shall be for a time fixed, and for not more than one year, and the mortgagor or pledgor shall have a right to redeem his property mortgaged or pledged at any time before it is sold, pursuant to the contract between said mortgagor or pledgor and said corporation, or before the right of redemption is foreclosed, on the payment of the loan and interest at the time of the offer to redeem. No loan of more than one thousand dollars shall be made to any one person. The rate of interest upon any loan made by said corporation shall not exceed two per cent a month. No dividend shall be paid in excess of six per cent per annum.

Maryland.—An act of the Maryland legislature of 1902, regulating the loaning of money when, as security for such a loan, a lien is taken upon household furniture and effects, musical instruments, typewriters, and sewing machines, authorizes a charge for the examination or valuation of property offered as security for a loan and the preparation of the necessary papers, as follows:

On sums of $1 to $50, a charge of $5; on sums of $51 to $100, a charge of $6; on sums of $101 to $1,000, a charge of $6 plus 5 per cent of increase over $100; on sums of $1,001 and upward, a charge of $6 plus 5 per cent of increase over $100 and plus 2½ per cent of increase over $1,000.

The said act also authorizes the collection of the amount actually to be paid for recording papers, revenue stamps, and fire-insurance premiums. While all of the loans under this act only bear interest at the rate of 6 per cent per annum, it is plain that the fixed charges by law more than raise the actual rate of interest to 2 per cent per month on ordinary short-time loans.

CHAPTER XV.

HOW TO BENEFIT THE POOR IN THE SLUMS.

[By WM. F. DOWNEY.]

For many years the board of trade and other civic associations have shown a deep interest in the material improvements in Washington. Each year we have the reports of various committees on improvements, embracing the departments of public buildings, parks, bridges, harbors, streets, trees, sewers, manufactures and commerce, railroads, etc., in which recommendations are made that millions of dollars be appropriated for such improvements.

While it is very commendable of our citizens to use every means possible pertaining to the manufacturing and commercial progress and material welfare of our city, we should not overlook that portion where the poor dwell in slums, alleys, and courts, in unsanitary and uninhabitable abodes. We can not truthfully boast of or take pride in our capital city until we improve the conditions of our slum property and remove the festering plague spots which are equally a menace to the health and morals of the community.

Our attention must be directed to these slums and plague spots where the poor are forced to live. As long as these sources of poverty and crime are allowed to exist in our city, and are tolerated by law, there is little use in attempting to reform them; such evil haunts are so many poison springs constantly throwing forth their putrid waters over our city, and until they are purified all moral efforts will avail but little.

The surgeon who is called to treat a patient does not devote his services to the sound parts of the body, but immediately directs his attention to the diseased spot. So it behooves us to apply our remedies to the slums and plague spots of the community, where poverty prevails, immorality is rampant, and crime originates and flourishes.

We notice that the health authorities in every town and city in the land are endeavoring to prevent or check infectious diseases, and if anyone becomes infected, that one is immediately quarantined. Similar precautions are taken in the case of steamers arriving in port with contagiously diseased patients on board. While this all-important attention is given to such cases, why should we permit greater evils to exist which spread their blasting effects through the community, and transfer the contagion from generation to generation, such as consumption and other diseases, emanating from immoral lives due to dens of infamy, low saloons, etc.? Insanitary and uninhabitable dwellings, where people are crowded together, breed and spread considerable disease. For instance, many people live in these places at night, and work in homes all over the city during the day. In this way the disease germs are carried into many homes, endangering the health of our little ones and blighting the happiness of our people.

Much praise is due to Mr. Charles F. Weller, and those connected with the Associated Charities for the light they have thrown on the slum problem, and the aid they have rendered to those who dwell there; also the Washington Sanitary Housing Company, which has aided so many people of limited means to secure houses a moderate rental. Squalid shacks have disappeared from certain quarters and their sites are now occupied by habitable dwellings; the purpose which brought about this change is worthy of commendation. Every effort which elevates and improves land and houses is entitled to its meed of praise. But while the housing movements have benefited a class of people who are able to pay moderate rents, what has become of the unfortunates who dwell in shacks?

It is an easy matter to stigmatize the unfortunate with the names their depraved habits deserve, but what of their reform; has there been anything done to elevate them, to cleanse them, to withdraw them from their evil associates?

This is the work under present contemplation. These poor creatures should not be driven to desperation; we should see to it that means are available to effect their temporal, physical, and moral welfare.

It may be a work meriting all praise to beautify a portion of the city in which we live, enhancing the value of property and of elevating human life. Indeed, it will be cheerfully conceded that such work is deserving of the highest praise. But how incomparably better is the merit of the effort and toil spent in uplifting frail members of the human family. They are for eternity, and should they not be impressed with the knowledge of the fact "Whatsoever you do to the least of these, you do unto Me," said the Savior of men.

Shacks and shanties may be transformed into residences and mansions, but they will crumble away. The depraved citizen of the slums is destined for eternity; he is made in the image of God. His being known, should it not be glorious work to restore the Image, which has been well-nigh obliterated by dissipation and sin? The merit of an undertaking is due to the object and the aim. Judged by this canon how supremely meritorious is the work of redeeming and uplifting those who have fallen away from their high inheritance as children of God, and who are held in the thrall of base servitude. To beautify a city and to make habitable homes is a work of commerce and art; to uplift and fortify frail humanity is to cooperate with Christ in the work of redemption.

If the Government can build prisons for the criminals, almshouses for the poor, asylums for the afflicted, and public schools, libraries, etc., on which millions of dollars have been spent, it would seem that in common sense and in logic there can be no condemnation for an application of the same solicitude to the aid of those who are in a condition of semiparalysis, owing to economic conditions. A little government aid extended to these unfortunates in the form of a loan to build them habitable dwellings would tend immensely toward their uplifting and improvement.

The home is the very foundation and corner stone of society, and should be particularly guarded against the contamination of all vice.

All unsightly and insanitary property should be condemned and purchased by the Government, improved in a uniform manner, and inexpensive an dhealthful habitations erected for the poor, who could rent or purchase these homes on installment plans, at low rates of interest. Should this be done, all would be benefited, for not like money spent in the erection of prisons, poorhouses, libraries, schools, etc., that never return to the public exchequer, the money expended on such homes would return in the form of regular monthly payments, and this in turn could be used for the continuance and spread of the good work of elevating the masses.

It is manifestly unfair to exact exhorbitant rents from the poorer classes; the poorer a man is the more he is at the mercy of the owner, and this is the very man the city should try to assist. Think of it—these families paying rents for shacks, which give a gross return to the owner of from 9 per cent all the way to 35 per cent; renters pay from $6 per month to $12.50 which bring in these large returns of interest. (See report of committee on building model houses in Washington, D. C., 1908.) The fact that these renters pay from $6 to $12.50 per month shows that they are among the

poorer classes. It is the sick man who needs medicine; likewise the poor man needs assistance. In many instances there is little or no chance of his coming to the front without this assistance.

How many poor helpless creatures born in the slums would, if opportunity were given to them, develop in a pure atmosphere a noble manhood and womanhood, which would make them the pride of the country, instead of becoming or remaining a burden to the community? They might become some of the best citizens and brightest statesmen if their childhood days were rescued from unhallowed surroundings. This is no dream, but the actual experience of the writer, who has succeeded in helping numbers of individuals and families to become self-helpful and rise to the highest grade of citizens.

We read in the newspapers of the day of eminent men, well qualified to speak on the subject, making an outcry against the wasteful use of coal, iron, and timber and predicting a famine of the same in future generations. While this subject is very commendable, I sincerely hope the day is not far distant when the distinguished people will also consider the temporal and moral welfare of the citizens, which I think should be regarded as the most important of all subjects, as it does not only pertain to the permanent and thorough improvement and beautifying of our national capital city, but pertains chiefly to the uplift of our citizens.

It is only the Federal Government which controls the affairs of the city of Washington, which could undertake such a necessary and meritorious work, by having an act passed by Congress giving power to appoint three men—an engineer, an architect, and a sanitary engineer—with power to condemn, purchase, and improve property in squares having narrow minor streets, and alleys without proper openings. Many of such squares are crowded with insanitary and uninhabitable dwellings, which make them a menace to the health and morals of the unfortunate people who are forced to dwell there. This seems to be the only correct way to deal practically with this question, and it readily appeals to the intelligence and desire of every good citizen who has the welfare of our city and citizens at heart.

See the great advantage which would be derived from such an undertaking. The commission suggested, of three gentlemen, would first map out the improvements to be made in such squares, and after the condemnation of certain lots and parts of lots, then to erase all unsightly buildings from the land, so that the improvements could be made in a uniform manner by grading and beautifying the land, and erect houses on the most suitable plan. The streets in such squares should not be less than 40 feet wide from building to building to be divided in the following manner: Take 10 feet in the center for a parking, where trees could be planted, giving good shade in summer to the occupants of the houses on each side of the street and affording 15 feet roadway for each side of the street. This parking and arrangement of the streets through squares would afford the children ample playgrounds and save them from the many dangers liable to happen on the public streets from trolley cars, teams, automobiles, etc. Of course there are other methods for street construction, but the one here suggested would no doubt be desirable, and

give the houses air and sunshine, so essential to afford a bright, healthful home.

The police department could carry on this work without additional expense to the Government; the police officers could not only be made preservers of law and order, but also, as far as possible, suppress and remove every source of evil, particularly those endangering the morals of our youth. They could also be made the sanitary inspectors and collect the monthly rents and installments from the people who rent or purchase these houses. This money would go right back into the funds of the Government, and be available for the improvement of other such property, which in time would eliminate every undesirable and uninhabitable house in the city.

If such an arrangement would be adopted it would bring about an entire change in our city government, for instead of the police officers being the prosecutors and persecutors of our unfortunate and criminal classes, who are ruined by the existing vices spread nearly everywhere, they would suppress and remove as far as possible the vices and save the citizens. I predict if this plan was put in operation it would reduce the criminal class more than 50 per cent. The policeman should act as the good samaritan, which would elevate him to the highest rank in public service and make him beloved and respected by every good citizen. In this way they could be made the greatest power for good.

While this plan is perhaps new in our country, somewhat similar plans have worked successfully in several foreign countries. I know that foreign experiences do not apply fully to our country, and a plan might work successfully there and not here on account of different political and social conditions, but the problem is about the same and its solution is of basic importance. We can profit by foreign experience and modify the plan so as to meet our social and political conditions. I submit the plan herein outlined. Having the problem to deal with in the United States, we should be the leaders and not the followers.

Granting, then, that the problem exists and that the United States should lead in its solution, I know of no city where it could be tried to better advantage than in the city of Washington, and its success here would mean in time its success in every city in our country. There is no reason why our city should not be the finest in the world, morally as well as materially and intellectually, and it soon would be if we set about it in the right way. We have already secured prestige as a center of art, letters, and legislation. Let us endeavor likewise to protect and influence our citizens to the highest moral standard by aiding them to secure better homes and to guard and protect them from the contaminating influence which now confronts them everywhere.

APPENDIX A.

HEALTH OF EMPLOYEES IN THE GOVERNMENT PRINTING OFFICE, WASHINGTON.[a]

[By WM. J. MANNING, M. D., Medical and Sanitary Officer, Government Printing Office.]

Owing to improved hygienic conditions in modern printing offices, type foundries, and stereotype and electrotype foundries, lead poisoning now exists to a very limited extent in these trades.

In the Government Printing Office at Washington, where upward of 4,500 employees are gathered in one building, excellent hygienic conditions prevail. Every ten minutes the air in each room is changed by a very simple device, consisting of air shafts leading from the basement to the roof, and which are pierced in each room near the ceiling with suitable openings. A revolving fan placed just below the roof creates a suction, so that a constant supply of fresh air is available at all times, owing to the vacuum thus formed.

The electrotype and stereotype foundries are placed on the topmost floor, the modern, rapidly moving elevators making this practicable, so far as the employees are concerned. At that height from the ground currents of air are constantly in motion, with a consequently greater diffusion of the gases than would prevail on floors nearer the ground. In the large newspaper buildings of the cities in the United States the same idea is being carried out, these rooms being placed as high in the air as possible.

In the type-founding and stereotyping trades employees whose duties call them to work over the fumes of the melting pots are most exposed to the injurious influences of lead, although the large amount of alloy present tends to lessen the danger.

"Finishers" of the plates, who handle only the smooth, hard, bright slabs of the alloyed metal, which are free from all oxides, run the least risk of lead poisoning. The fact that there is little or no dust, coupled with the fact that the small particles which rub off the plates on the hands of the workman are in the metallic state and perfectly dry renders it less liable to be absorbed. In contradistinction to this is the case of the painter. Here the lead, being in the form of a carbonate (white lead) and being mixed with such an excellent absorbing material as oil, is much more rapidly absorbed.

EMERGENCY ROOM, GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C.

In type foundries practically the same conditions exist as in electrotype foundries. Those who work in the vicinity of the melting pots are much more liable to the toxic vapors which arise from the melting pot. This is particularly the case where the lead is impure and contains volatile substances which, combining with the lead fumes, might possibly add to the toxic influences of the lead. Hence, in "fluxing" the metal, when wax is used as the agent, as little as possible should be used.

Females are, as a rule, employed in this country to sort, finish, and pack the type. Here, as with the "finishers" in the electrotype foundries, the metal is bright and free from oxides, besides being largely alloyed; hence, the chance

[a] Doctor Manning's article on Plumbism, which is here reproduced, was submitted by him in competition for a prize offered by the Internationales Arbeitsamt, Basel, Switzerland. The article was purchased for publication by that office on account of merit.

of absorption with toxic results is greatly lessened. Doctor Osler has pointed out that the ratio of women susceptible to lead poisoning is small as compared with men. Why they are thus immune is hard to say; but, so far as type founding is concerned, probably the above statement indicates the cause.

With the compositor the chances of absorption of lead from the type metal by the skin is probably nil. Only a small portion of the epidermis of the fingers (the apex of the thumb and forefinger) is brought in contact with the metal both in "distributing" and in "setting," and the epidermis at these parts is in a more or less thickened, dense condition. Thus, the compositor is protected from absorbing the metal, even when the type is covered with the hydrate which is formed by the long-continued action of air and water. It is well known that substances are absorbed but slightly, if at all, through the skin that is in a thickened condition. If one will stop to consider that the small atoms which become separated from the metal type in one way and another are in a metallic form the chances of absorption are even more remote.

The danger to the compositor, as with the melting-pot tender, would seem to lie in inhalation. With the former the introduction into the system would be by dust, and with the latter in the form of gas.

When foreign bodies are taken into the system in a state of fine subdivision, the favorite seat will be found, as a rule, in the bronchi and the lungs. The process, so far as compositors are concerned, might be termed plumbiosis. The dust which is not carried directly into the alveoli of the lungs by the air breathed finds lodgment on the membrane of the bronchi and the ramifications thereof. That considerable dust is carried down the esophagus into the stomach and from there swept out into the intestines is not to be doubted. Might not these fine particles cause the "colic" or active peristalsis by the stimulation of the circular and longitudinal muscular fibers in a mechanical way on the muscles themselves or in a chemic way by a stimulation of the nerves controlling these fibers? This "colic" is one of the first symptoms complained of by the patient.

That the white blood corpuscles play an important part in carrying this finely divided substance throughout the body is also probable, the mode of action being to inclose the fine particles and try to dissolve them, and, failing in that, to transport them to distant points in the body and to the various organs. In that condition known as anthracosis, or coal-miner's consumption, the lung is found to be covered with black dust. The same conditions are found in those suffering from stonecutter's consumption, the lack of carbon rendering the pigment somewhat lighter in color. The condition is known as lithosis. In the knife and saw sharpener's trade the dust is in the form of steel and the consequent disease is known as siderosis. In each case the fine dust finds lodgment in the lungs.

The lungs become so pigmented after long exposure to these conditions, and the alveoli so congested and choked, accompanied by a low form of inflammation that the substances set up, that this, with the unhygienic surroundings and bad ventilation, might explain why so many compositors die each year from tuberculosis. Certainly the tubercle bacilli find a congenial environment in which to begin their fatal work. To the above conditions must be added, of course, the toxic influence of the lead itself, together with the persistent astringent effect of the lead on the air cells. Lead is a very feeble antiseptic and does not seem to inhibit the growth of the bacilli.

The lymph nodes very likely play an important part in carrying the lead through the body to produce plumbism. When lymph nodes become loaded with foreign material of any nature they are apt to break down and the circulation carries the substances to various parts of the body. This would seem to explain the peculiar color of those suffering from plumbism, and it might explain why the kidneys become so irritated and why albumin is found in the urine. Certain tissues seem to have an affinity for the lead thus carried and it is deposited in them. The blue line on the gums which is pathognomic of lead poisoning may be the result of this. It may be that sulphur, which has such a strong affinity for lead and which might be taken into the mouth in articles of food and drink causes this pigmentation. It is strange that the blue line does not make its appearance on any other part of the body. Certain it is that the potassium sulphite when added to a bath will bring out this pigment over the entire body, which remains until the lead in the skin is either eliminated or the affinity is satisfied.

Lead poisoning in the chronic form, as already stated, is very rare among type founders, electrotypers, stereotypers, and in the printing trades in this country. It may present itself in the regular type or the symptoms may be hidden. The characteristic symptoms are the blue line on the gums, and the wrist drop, due to the paralysis of the extensors of the forearms. In some cases it first makes its appearance in anæmia and in loss of strength. Anæsthesia may appear in spots on different parts of the body, the spots varying in size from half a dollar to tracts as large as the hand. They may appear on the arms, legs, or on the back. In some cases, however, these symptoms are entirely absent. Albumin may appear in the urine. Doctor Osler describes cases that have come under his care where the symptoms resembled gout and rheumatism. The joints would swell and become very red and tender, the patient suffering all the while intense pain. Doctor Wood mentions cases where the symptoms resembled actue poliomyelitis. In other cases there was simply a failure of health, anæmia, nervous phenomena, etc., the patient having ill-defined, sharp, shooting pains. The pain from the colic seems to merge from the umbilicus in all instances. Arteriosclerosis has been noticed with atrophy of the kidneys and hypertrophy of the heart, the enlargement of the latter organ probably being due to the redoubled effort of the heart to force the blood through the various contracted distal organs. This contraction may be due in a measure to the astringent action of the lead which is noticed upon all tissues when lead is applied in its various forms.

The treatment in these cases may be divided into the preventive and curative, the former relating, of course, only to the trades mentioned in this article. Among the measures which might be taken in the prevention of plumbism in the printing, type founding, and electrotyping and stereotyping trades would be, first of all, the location. The rooms devoted to the melting of type metal should be situated as high as possible in the air, and on the topmost floor of the building. The pots should be covered with iron hoods that will cover the entire top of the melting pot proper. The hood should set as near the metal as possible, in such a way that it will not interfere with the manipulation of the ladles or dippers. Hoods with small pipes when used as fume chambers do not answer. It has been found that to be of any service or benefit, the pipe leading from the hood or fume chamber should be nearly as large as the chamber itself, and should lead to a smoke chimney or into the outside air. The heat generated should supply draft enough to carry the fumes off in this way. It might be aided by placing a revolving circular ventilator in the pipe from the outside and operated by the wind. The whole thing might be made very cheaply of galvanized iron. Various face masks have been suggested, but none seem to be practical, and after they are worn for some time really become a greater danger than if they had not been used, owing to the lack of cleanliness. Cotton and such substances in the nose are useless, because the workman will then breathe through his mouth. The rooms should be at least 10 feet high. Windows should be placed on both sides of the room, so that a current of air may be in constant motion and a fresh supply always on hand. In winter or bad weather a very simple way to obtain fresh air consists in placing a board 3 or 4 inches high lengthwise under the lower window sash. This will enable the fresh air to enter between the lower and upper windows without causing a direct draft on the workmen.

The personal treatment on the part of the workman should be a change of underclothing after work, a bath at least three times a week in hot water with plenty of soap, and at the same time the vigorous application of a flesh brush to the skin. The object here is twofold—to keep the pores free and to remove any particles that may have lodged there, and hence lessen the danger of absorption, while at the same time helping the pores to eliminate that which has been absorbed. The bowels should be kept open by the use of such simple laxatives as sweet oil, castor oil, calomel and soda, etc. An electrotyper who has been in the business for some forty years, and who is now the chief of the largest foundry in the world, informed me that it was his custom to take a teaspoonful of sweet oil every other day, and that he had never suffered from any ill effects of plumbism.

So far as compositors are concerned, the preventive treatment just described would apply to them. The principal danger here is the bad ventilation, insanitary surroundings, and the dust (principally graphite and minute particles of type metal) which becomes detached by the abrasion of the pieces against each other while being handled. To offset this, "cases" should be blown out by a bellows at least once each week; if possible, in the open air. The bottoms

in the different boxes, instead of being flat and square cornered, and covered with paper, should be slightly concave at the bottom, with the corners rounded somewhat like a cash till, the idea being to keep the dust from lodging in the corners, where it is difficult to remove even with a bellows. In cases constructed in this manner the dust is, by its own weight, constantly working its way toward the center of each box, where it can easily be removed.

A practical method of removing the caked dust is in vogue in the Government Printing Office at Washington. The type forms after leaving the electrotype foundry are placed on a raised rack which drains into a shallow tank some 6 inches in depth, a pipe connecting this with a sewer. The forms are placed in a horizontal position—that is to say, the side of the chase rests on the rack. Steam under pressure is conducted by a rubber hose and the face of the type is thoroughly "blown," as is the reverse of the form. Later, when the This chamber consists of a zinc-lined box about 6 feet in length, 4 feet wide, and 4 feet high, a trapdoor opening from the top being the only opening. In the bottom is placed a coil of steam pipe which covers the entire floor of the box, one end of the pipe being left open. The pages of type are placed on shallow perforated trays somewhat like a "galley," each tray fitting in a copper rack, consisting simply of two loops of copper, somewhat like an inverted U, with pins attached on which the trays set. Each rack holds eight pages, or a "signature," on the eight trays. After the box is filled, steam is turned on and the type is thoroughly boiled for an hour or more. The pages are lifted in and out by means of hooks. This method not only removes the graphite but disintegrates the type and "loosens" it, permitting easy distribution. It also leaves the type very clean and aseptic, lessening the chances of infection by the absence of germs. The method of letting cold water run on the forms and thus cleansing them is not so thorough, because the graphite "cakes" and clings to the type and the dust is thrown into the compositor's case with the type, making the cases very dusty and dirty. Each compositor should supply himself with a small brush, suitable for the hands, to be used each time he washes. A private drinking cup is desirable.

In acute cases of lead poisoning the treatment consists in the administration of alkaline carbonates, soap, soluble sulphates, sodium chloride, etc., washing out the stomach with large drafts of water, etc. Alum has been given, and at one time was considered almost a specific. Sweet oil and castor oil will be found useful. Milk should be taken in large quantities. The idea is first to combat the symptoms and then eliminate the lead. Opium can be given for pain. Warm sulphureted baths are very beneficial. They can be made by dissolving 4 ounces of potassium sulphide in 30 gallons of water in a wooden tub. These baths discolor the skin, from the formation of lead sulphide, and should be repeated every few days until this effect ceases. During each bath the patient should be well washed with soap and water to remove discoloration.

The various kinds of typesetting machines all have a melting pot attached to each machine, and where many are in use, unless there is plenty of pure air constantly entering the room and perfect ventilation provided, the fumes from each pot should be conducted by pipes to a chamber in which a vacuum is present, so that the fumes may be instantly removed and carried out into the atmosphere. The virtue of the machine lies in the fact, so far as health is concerned, in the absence of dust, and with the additional advantage on the part of the operator that he does not lay himself open to exposure in handling the metal to so great a degree as in the case of the hand compositor.

There are other alloys that would take the place of lead in type metal, but owing to the excessive cost and high fusing point their use is not practical.

DOCTOR MANNING'S METHOD FOR THE COLLECTION, DISINFECTION, AND DISPOSAL OF SPUTA.

From a sanitary point of view the collection, cleaning, and disinfection of the spittoons in the Government Printing Office is a matter of considerable importance. This will be readily understood when it is remembered that there are over 4,300 persons engaged during the twenty-four hours, all working in eight-hour shifts, and that no fewer than 1,200 cuspidors must be cleaned at the end of each shift.

The method now installed under Doctor Manning's direction effects this without direct digital contact. It consists in a central sterilizing chamber situated in the basement of the Printing Office, with a cement floor, graded toward the

U.S. GOVERNMENT PRINTING OFFICE
INDUSTRIAL HYGIENE
Showing a method in Practical Operation
to combat Tuberculosis by the Disinfection
and disposal of Sputa as applied to crowded
Manufactories and Workshops.
4800 EMPLOYEES.
I regard the wage worker, excepting only
the farmer, the tiller of the soil, as the man
whose well being is most essential to the
healthy growth of this great nation.-ROOSEVELT.

GOVERNMENT PRINTING OFFICE EXHIBIT, INTERNATIONAL CONGRESS ON TUBERCULOSIS.

center and made up of two inclines. All edges, angles, corners, and returns of the floor are well rounded and the base of each of the four walls have 6-inch "sanitary bases" in order that all parts of the room may be self cleansing and draining. The walls of the sterilizing chamber are composed of white, glazed, vitrified brick.

The cuspidors are collected by means of a specially designed sanitary clutch which picks up the cuspidors in an automatic manner, one above the other, in "nests" of five, without the janitor or cleaner in any manner touching his person or in any way coming in contact with the infected or soiled cuspidors, avoiding entirely the irksome, repulsive features which characterize the methods in vogue at the present time as concerns the washing of spittoons, and greatly minimizes the danger of contraction of tuberculosis by all concerned, and serves, in addition, to draw attention and illustrate a lesson in hygiene to the unthinking and careless.

The vessels thus collected are carried by means of the clutch or holder to specially designed wooden, zinc-lined box trucks with detachable sides. Each truck is capable of holding 175 cuspidors for transmission to the sterilizing chamber. As 5 soiled cuspidors are taken to the truck they are replaced by 5 sterilized cuspidors picked up and distributed by the same mechanism, all of which is accomplished by the use of one hand only of the operator. After the trucks are filled they are transmitted from the respective floors to the basement on a freight elevator and wheeled directly into the sterilizing chamber.

In the chamber is fitted up an iron rack similar in form to that shown in photograph taken of Government Printing Office exhibit at the International Congress on Tuberculosis, and is constructed of strips of 1-inch angle iron, from which hang suspended at intervals of 10 inches steel-wire clutches, shaped somewhat like an inverted letter U, into which are thrust the cuspidors after they have been dipped and washed in boiling water (212° F.), and from whence they are taken after they have been drained or dried, and replaced in trucks for transmission back to the floors of building.

A galvanized-iron trough, connected directly with the sewer, is placed at the base and in front of the iron rack. The hot, boiling water is piped directly into this trough after it has been heated for this purpose by jets of steam entering the pipe through which the cold water flows.

The contents of cuspidors are emptied directly into the trough by means of short forceps which grasp the lip of the cuspidor, whence it escapes to the sewer. After the vessel has been made thoroughly clean and sterilized by immersion in the boiling water, the operator, still grasping the forceps, presses the vessel into the steel spring clutch on rack, where it drains and dries, as shown in photograph.

After the cuspidors have all been washed and sterilized in the manner described, they are quickly removed from the spring clutch on iron rack by the cleaner and replaced in truck. As each layer is laid down in the truck, from 2 to 4 ounces of a solution made up of bichloride of mercury 7.3 grains; citric acid, 7.7 grains to each gallon of water, which, in addition, is colored with eosin to differentiate the solution and to warn persons that the liquid is not water, is poured into each spittoon, where it remains until all the vessels are washed again. This gives a strength solution sufficient to kill the most resistant disease germs, yet when still further diluted with water in the trough during the cleaning process, renders the solution harmless to plumbing work or the piping of sewers.

The bichloride is used for its germicidal power, while the citric acid is added to retard the coagulation of the albumin in the saliva and expectorations, and thus render the action of the bichloride of mercury more potent. It is one of the most powerful antiseptics known to science.

The entire cost of the chemical disinfectants named amounts to less than $12 per annum. Five gallons can be made for about 1 penny.

The cuspidors are specially designed to permit of easy cleaning and self-draining, largely on account of the character of the curves employed. Angles which would interfere with the cleaning process have been avoided, and the stream of water will readily reach all the internal surfaces. The constriction, or neck, is sufficiently wide to permit the stream of the hose to enter with full force. A certain amount of constriction at the neck seemed desirable to hide the contents of cuspidor when in use. They were designed, however, with the special object of easy cleaning and without direct digital contact, because it would seem almost inhuman to ask a cleaner to place his hand,

containing even a sponge, in the ordinary stock cuspidor and wash the interior in a thorough and sanitary manner. All of this repulsive work has been avoided, so that by the new method the operator does not touch the cuspidor with his hands until he plucks the washed and sterilized cuspidor from the rack and places it in the truck.

Hard vitrified china ware has been used to construct the cuspidors, as this is the only material that will withstand the corrosive action of bichloride of mercury and at the same time present a smooth, white surface for sanitary cleansing.

Approximately about 8,800 barrels of sawdust are used each year for cuspidors in the Government Printing Office, at a cost of about $100 per month. While, of course, this item will be saved, together with the cost of handling and carting away of the foul and polluted sawdust, the main object has been to reduce to a minimum the danger of infection through tuberculosis sputa among the employees.[a]

* * * * * *

The report of Doctor Manning, in charge of the sanitary division of the Government Printing Office, shows that of 4,556 employees in the building from January 1, 1906, to February 29, 1908, 1,153 employees received treatment at the emergency room, 595 were medical cases inclusive of 9 cases of lead colic. Of these, 516 resumed work, 76 were sent home for treatment, and 3 died. Of the 558 surgical cases, 517 resumed work and 41 were sent home for treatment. The emergency department is well equipped, and the results have in every way justified its establishment.

APPENDIX B.

REGULATION OF DANGEROUS TRADES IN ENGLAND.

In addition to the general provisions regarding ventilation, etc., which apply to all manufacturing establishments, the English factory and workshop act (1901) contains a chapter of special provisions for dangerous and unhealthy industries, which is reprinted below, together with the special rules and regulations issued by the government officials in accordance with the grant of authority therein made.

FACTORY AND WORKSHOP ACT, 1901.

PART IV.—*Dangerous and Unhealthy Industries.*

(1) SPECIAL PROVISIONS.

SECTION 73. (1) Every medical practitioner attending on or called in to visit a patient whom he believes to be suffering from lead, phosphorus, arsenical, or mercurial poisoning, or anthrax, contracted in any factory or workshop, shall (unless the notice required by this subsection has been previously sent) send to the chief inspector of factories at the home office, London, a notice stating the name and full postal address of the patient and the disease from which, in the opinion of the medical practitioner, the patient is suffering, and shall be entitled in respect of every notice sent in pursuance of this section to a fee of 2 shillings and 6 pence, to be paid as part of the expenses incurred by the secretary of state in the execution of this act.

(2) If any medical practitioner, when required by this section to send a notice, fails forthwith to send the name, he shall be liable to a fine not exceeding 40 shillings.

[a] All of the mechanical devices used in the above method have been designed by Doctor Manning, and were awarded a special gold medal by the International Congress on Tuberculosis, 1908.

GOVERNMENT PRINTING OFFICE EMERGENCY ROOM.

(3) Written notice of every case of lead, phosphorus, arsenical, or mercurial poisoning, or anthrax, occurring in a factory or workshop shall forthwith be sent to the inspector and to the certifying surgeon for the district; and the provisions of this act with respect to accidents shall apply to any such case in like manner as to any such accident as is mentioned in those provisions.

(4) The secretary of state may, by special order, apply the provisions of this section to any other disease occurring in a factory or workshop, and thereupon this section and the provisions referred to therein shall apply accordingly.

SEC. 74. If in a factory or workshop where grinding, glazing, or polishing on a wheel, or any process is carried on by which dust, or any gas, vapor, or other impurity, is generated and inhaled by the workers to an injurious extent, it appears to an inspector that such inhalation could be to a great extent prevented by the use of a fan or other mechanical means, the inspector may direct that a fan or other mechanical means of a proper construction for preventing such inhalation be provided within a reasonable time, and if the same is not provided, maintained, and used, the factory or workshop shall be deemed not to be kept in conformity with this act.

SEC. 75. (1) In every factory or workshop where lead, arsenic, or any other poisonous substance is used, suitable washing conveniences must be provided for the use of the persons employed in any department where such substances are used.

(2) In any factory or workshop where lead, arsenic, or other poisonous substance is so used as to give rise to dust or fumes, a person shall not be allowed to take a meal or to remain during the times allowed for him for meals in any room in which any such substance is used, and suitable provision shall be made for enabling the persons employed in such rooms to take their meals elsewhere in the factory or workshop.

(3) A factory or workshop in which there is a contravention of this section shall be deemed not to be kept in conformity with this act.

SEC. 76. (1) A woman, young person, or child must not be employed in any part of a factory in which wet spinning is carried on unless sufficient means are employed and continued for protecting the workers from being wetted, and where hot water is used for preventing the escape of steam into the room occupied by the workers.

(2) A factory in which there is a contravention of this section shall be deemed not to be kept in conformity with this act.

SEC. 77. (1) In the part of a factory or workshop in which there is carried on (*a*) the process of silvering of mirrors by the mercurial process, or (*b*) the process of making white lead, a young person or child must not be employed.

(2) In the part of a factory in which the process of melting or annealing glass is carried on a female, young person, or a child must not be employed.

(3) In a factory or workshop in which there is carried on (*a*) the making or finishing of bricks or tiles not being ornamental tiles, or (*b*) the making or finishing of salt, a girl under the age of 16 years must not be employed.

(4) In the part of a factory or workshop in which there is carried on (*a*) any dry grinding in the metal trade, or (*b*) the dipping of lucifer matches, a child must not be employed.

(5) Notice of a prohibition contained in this section must be affixed in the factory or workshop to which it applies.

SEC. 78. (1) A woman, young person, or child must not be allowed to take a meal or to remain during the time allowed for meals in the following factories or workshops, or parts of factories or workshops; that is to say, (*a*) in the case of glass works in any part in which the materials are mixed; and (*b*) in the case of glass works where flint glass is made, in any part in which the work of grinding, cutting, or polishing is carried on; and (*c*) in the case of lucifer-match works, in any part of which any manufacturing process or handicraft (except that of cutting the wood) is usually carried on; and (*d*) in the case of earthenware works, in any part known or used as dippers' house, dippers' drying room, or china scouring room.

(2) If a woman, young person, or child is allowed to take a meal or to remain during the time allowed for meals in a factory or workshop or part thereof in contravention of this section, the woman, young person, or child shall be deemed to be employed contrary to the provisions of this act.

(3) Notice of the prohibition of this section shall be affixed in every factory or workshop to which it applies.

(4) Where it appears[6] to the secretary of state that by reason of the nature of the process in any class of factories or workshops or parts thereof not named in this section the taking of meals therein is specially injurious to health, he may, if he thinks fit, by special order extend the prohibition in this section to the class of factories or workshops or parts thereof.

(5) If the prohibition in this section is proved to the satisfaction of the secretary of state to be no longer necessary for the protection of the health of women, young persons, and children, in any class of factories or workshops or parts thereof to which it has been so extended, he may, by special order, rescind the order of extension, without prejudice to the subsequent making of another order.

(4) REGULATIONS FOR DANGEROUS TRADES.

SEC. 79. Where the secretary of state is satisfied that any manufacture, machinery, plant, process, or description of manual labor, used in factories or workshops, is dangerous or injurious to health or dangerous to life or limb, either generally or in the case of women, children, or any other class of persons, he may certify that manufacture, machinery, plant, process, or description of manual labor to be dangerous; and thereupon the secretary of state may, subject to the provisions of this act, make such regulations as appear to him to be reasonably practicable and to meet the necessity of the case.

SEC. 80. (1) Before the secretary of state makes any regulations under this act, he shall publish, in such manner as he may think best adapted for informing persons affected, notice of the proposal to make the regulations, and of the place where copies of the draft regulations may be obtained, and of the time (which shall not be less than twenty-one days) within which any objection made with respect to the draft regulations by or on behalf of persons affected must be sent to the secretary of state.

(2) Every objection must be in writing and state—(*a*) the draft regulations or portions of draft regulations objected to, (*b*) the specific grounds of objection, and (*c*) the omissions, additions, or modifications asked for.

(3) The secretary of state shall consider any objection made by or on behalf of any persons appearing to him to be affected which is sent to him within the required time, and he may, if he thinks fit, amend the draft regulations, and shall then cause the amended draft to be dealt with in like manner as an original draft.

(4) Where the secretary of state does not amend or withdraw any draft regulations to which any objection has been made, then (unless the objection either is withdrawn or appears to him to be frivolous) he shall, before making the regulations, direct an inquiry to be held in the manner hereinafter provided.

SEC. 81. (1) The secretary of state may appoint a competent person to hold an inquiry with regard to any draft regulations, and to report to him thereon.

(2) The inquiry shall be held in public, and the chief inspector and any objector and any other person who, in the opinion of the person holding the inquiry, is affected by the draft regulations, may appear at the inquiry either in person or by counsel, solicitor, or agent.

(3) The witnesses on the inquiry may, if the person holding it thinks fit, be examined on oath.

(4) Subject as aforesaid, the inquiry and all proceedings preliminary and incidental thereto shall be conducted in accordance with rules made by the secretary of state.

(5) The fee to be paid to the person holding the inquiry shall be such as the secretary of state may direct and shall be deemed to be part of the expenses of the secretary of state in the execution of this act.

SEC. 82. (1) The regulations made under the foregoing provisions of this act may apply to all the factories and workshops in which the manufacture, machinery, plant, process, or description of manual labor certified to be dangerous is used (whether existing at the time when the regulations are made or afterwards established), or to any specified class of such factories or workshop. They may provide for the exemption of any specified class or factories or workshops either absolutely or subject to conditions.

(2) The regulations may apply to tenement factories and tenement workshops, and in such case may impose duties on occupiers who do not employ any person, and on owners.

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[6] For orders extending the prohibition in this section, see post.

(3) No person shall be precluded by any agreement from doing, or be liable under any agreement to any penalty or forfeiture for doing, such acts as may be necessary in order to comply with the provisions of any regulation made under this act.

SEC. 83. Regulations made under the foregoing provisions of this act may, among other things—(*a*) prohibit the employment of, or modify or limit the period of employment of, all persons or any class of persons in any manufacture, machinery, plant, process, or description of manual labor certified to be dangerous, and (*b*) prohibit, limit, or control the use of any material or process, and (*c*) modify or extend any special regulations for any class of factories or workshops contained in this act.

SEC. 84. Regulations made under the foregoing provisions of this act shall be laid as soon as possible before both houses of Parliament, and if either house within the next forty days after the regulations have been laid before the house, resolve that all or any of the regulations ought to be annulled, the regulations shall, after the date of resolution, be of no effect, without prejudice to the validity of anything done in the meantime thereunder or to the making of any new regulations. If one or more of a set of regulations are annulled, the secretary of state may, if he thinks fit, withdraw the whole set.

SEC. 85. (1) If any occupier, owner, or manager, who is bound to observe any regulation under this act, acts in contravention of or fails to comply with the regulation, he shall be liable for each offense to a fine not exceeding £10 ($48.67) and, in the case of a continuing offense, to a fine not exceeding £2 ($9.73) for every day during which the offense continues after conviction therefor.

(2) If any person other than an occupier, owner, or manager, who is bound to observe any regulation under this act, acts in contravention of or fails to comply with the regulation, he shall be liable for each offense to a fine not exceeding £2 ($9.73) and the occupier of the factory or workshop shall also be liable to a fine not exceeding £10 ($48.67), unless he proves that he has taken all reasonable means by publishing, and to the best of his power enforcing, the regulations to prevent the contravention or noncompliance.

SEC. 86. (1) Notice of any regulations having been made under the foregoing provisions of this act, and of the place where copies of them can be purchased, shall be published in the London, Edinburgh, and Dublin Gazettes.

(2) Printed copies of all regulations for the time being in force under this act in any factory or workshop shall be kept posted up in legible characters in conspicuous places in the factory or workshop where they may be conveniently read by the persons employed. In a factory or workshop in Wales or Monmouthshire the regulations shall be posted up in the Welsh language also.

(3) A printed copy of all such regulations shall be given by the occupier to any person affected thereby on his or her application.

(4) If the occupier of any factory or workshop fails to comply with any provision of this section as to posting up or giving copies, he shall be liable to a fine not exceeding £10 (49.67).

(5) Every person who pulls down, injures, or defaces any regulation posted up in pursuance of this act, or any notice posted up in pursuance of the regulations, shall be liable to a fine not exceeding £5 ($24.33).

(6) Regulations for the time being in force under this act shall be judicially noticed.

Special rules and regulations.

White lead factories.
Red and orange lead works.
Yellow lead works.
Lead smelting works.
Factories using yellow chromate of lead.
Earthenware and china works.
Electric accumulator factories (regulations).
Iron-plate enameling works (using lead, arsenic, or antimony).
Tinning and enameling works (using lead or arsenic).
Paint and color works (extractions of arsenic).
Brass and compound metal mixing or casting shops.
Chemical works.
Bichromate or chromate of potassium or sodium works.
Explosive works (using di-nitro-benzole).

Vulcanized india-rubber works (using bisulphide of carbon).
Lucifer match factories using white or yellow phosphorus.
Felt-hat factories (regulations).
Handling of dry and dry-salted hides and skins imported from Asia.
Wool and hair sorting (regulations).
Flax and tow spinning and weaving (regulations).
File cutting by hand (regulations).
Bottling of aerated water.
Spinning by self-acting mules (regulations).
Loading goods on docks and wharves (regulations).
Use of factory engines and cars (regulations).

WHITE-LEAD FACTORIES.

[Form 247—February, 1903.]

In these rules "persons employed in a lead process" means a person who is employed in any work or process involving exposure to white lead, or to lead or lead compounds used in its manufacture, or who is admitted to any room or part of the factory where such process is carried on.

Any approval given by the chief inspector of factories in pursuance of rules 2, 4, 6, 9, or 12 shall be given in writing, and may at any time be revoked by notice in writing signed by him.

DUTIES OF OCCUPIERS.

1. On and after July 1, 1899, no part of a white-lead factory shall be constructed, structurally altered, or newly used, for any process in which white lead is manufactured or prepared for sale, unless the plans have previously been submitted to and approved in writing by the chief inspector of factories.

2. (*a*) Every stack shall be provided with a standpipe and movable hose, and an adequate supply of water distributed by a hose.

(*b*) Every white bed shall, on the removal of the covering boards, be effectually damped by the means mentioned above.

Where it is shown to the satisfaction of the chief inspector of factories that there is no available public water service in the district, it shall be a sufficient compliance with this rule if each white bed is, on the removal of the covering boards, effectually damped by means of a watering can.

3. Where white lead is made by the chamber process, the chamber shall be kept moist while the process is in operation, and the corrosions shall be effectually moistened before the chamber is emptied.

4. (*a*) Corrosions shall not be carried except in trays of impervious material.

(*b*) No person shall be allowed to carry on his head or shoulder a tray of corrosions which has been allowed to rest directly upon the corrosions, or upon any surface where there is white lead.

(*c*) All corrosions before being put into the rollers or wash becks shall be effectually damped, either by dipping the tray containing them in a trough of water or by some other method approved by the chief inspector of factories.

5. The flooring around the rollers shall either be of smooth cement or be covered with sheet lead, and shall be kept constantly moist.

6. On and after January 1, 1901, except as hereinafter provided—

(*a*) Every stove shall have a window, or windows, with a total area of not less than 8 square feet, made to open, and so placed as to admit of effectual through ventilation.

(*b*) In no stove shall bowls be placed on a rack which is more than 10 feet from the floor.

(*c*) Each bowl shall rest upon the rack and not upon another bowl.

(*d*) No stove shall be entered for the purpose of drawing until the temperature at a height of 5 feet from the floor has fallen either to 70° F., or to a point not more than 10° F. above the temperature of the air outside.

(*e*) In drawing any stove or part of a stove there shall not be more than one stage or standing place above the level of the floor.

Provided that if the chief inspector approves of any other means of ventilating a stove, as allowing of effectual through ventilation, such means may be adopted, notwithstanding paragraph (*a*) of this rule; and if he approves of any other method of setting and drawing the stoves, as effectually preventing white

lead from falling upon any worker, such method may be followed, notwithstanding paragraphs (*b*) and (*e*) of this rule.

7. No person shall be employed in drawing Dutch stoves on more than two days in any week.

8. No dry white lead shall be deposited in any place that is not provided either with a cover or with a fan effectually removing the dust from the worker.

9. On and after January 1, 1900, the packing of dry white lead shall be done only under conditions which secure the effectual removal of dust, either by exhaust fans or by other efficient means approved in each case by the chief inspector of factories.

This rule shall not apply where the packing is effected by mechanical means entirely closed in.

10. The floor of any place where packing of dry white lead is carried on shall be of cement, or of stone set in cement.

11. No woman shall be employed or allowed in the white beds, rollers wash becks, or stoves, or in any place where dry white lead is packed, or in other work exposing her to white lead dust.

12. (*a*) A duly qualified medical practitioner (in these rules referred to as the "appointed surgeon") shall be appointed by the occupier for each factory, such appointment to be subject to the approval of the chief inspector.

(*b*) No person shall be employed in a lead process for more than a week without a certificate of fitness granted after examination by the appointed surgeon.

(*c*) Every person employed in a lead process shall be examined once a week by the appointed surgeon, who shall have power to order suspension from employment in any place or process.

(*d*) No person after such suspension shall be employed in a lead process without the written sanction of the appointed surgeon.

(*e*) A register in a form approved by the chief inspector of factories shall be kept, and shall contain a list of all persons employed in lead processes. The appointed surgeon will enter in the register the dates and results of his examinations of the persons employed, and particulars of any directions given by him. The register shall be produced at any time when required by His Majesty's inspectors of factories or by the certifying surgeon or by the appointed surgeon.

13. Upon any person employed in a lead process complaining of being unwell, the occupier shall, with the least possible delay, give an order upon a duly qualified medical practitioner.

14. The occupier shall provide and maintain sufficient and suitable respirators, overalls, and head coverings, and shall cause them to be worn as directed in rule 29.

At the end of every day's work they shall be collected and kept in proper custody in a suitable place set apart for the purpose.

They shall be thoroughly washed or renewed every week, and those which have been used in the stoves, and all respirators, shall be washed or renewed daily.

15. The occupier shall provide and maintain a dining room and a cloakroom in which workers can deposit clothing put off during working hours.

16. No person employed in a lead process shall be allowed to prepare or partake of any food or drink except in the dining room or kitchen.

17. A supply of a suitable sanitary drink, to be approved by the appointed surgeon, shall be kept for the use of the workers.

18. The occupier shall provide and maintain a lavatory for the use of the workers, with soap, nailbrushes, and at least one lavatory basin for every five persons employed. Each such basin shall be fitted with a waste pipe. There shall be a constant supply of hot and cold water laid on, except where there is no available public water service, in which case the provision of hot and cold water shall be such as shall satisfy the inspector in charge of the district.

The lavatory shall be thoroughly cleaned and supplied with clean towels after every meal.

There shall, in addition, be means of washing in close proximity to the workers of each department, if required by notice in writing from the inspector in charge of the district.

There shall be facilities, to the satisfaction of the inspector in charge of the district, for the workers to wash out their mouths.

19. Before each meal, and before the end of the day's work, at least 10 minuts in addition to the regular meal times shall be allowed to each worker for washing.

A notice to this effect shall be affixed in each department.

20. The occupier shall provide and maintain sufficient baths and dressing rooms for all persons employed in lead processes with hot and cold water, soap, and towels, and shall cause each such person to take a bath once a week at the factory.

A bath register shall be kept containing a list of all persons employed in lead processes and an entry of the date when each person takes a bath.

This register shall be produced at any time when required by His Majesty's inspectors of factories or by the certifying surgeon or by the appointed surgeon.

21. The dressing rooms, baths, and water-closets shall be cleaned daily.

22. The floor of each work room shall be cleaned daily, after being thoroughly damped.

DUTIES OF PERSONS EMPLOYED.

23. No person shall strip a white bed or empty a chamber without previously effectually damping, as directed in rules 2 and 3.

24. No person shall carry corrosions or put them into the rollers or wash becks otherwise than as permitted by rule 4.

25. No person shall set or draw a stove otherwise than as permitted by rules 6 and 7.

26. No person shall deposit or pack dry white lead otherwise than as permitted by rules 8 and 9.

27. Every person employed in a lead process shall present himself at the appointed times for examination by the appointed surgeon, as provided in rule 22.

28. No person, after suspension by the appointed surgeon, shall work in a lead process without his written sanction.

29. Every person engaged in [stripping] white beds, emptying chambers, rollers, wash becks, or grinding, setting, or drawing stoves, packing, paint mixing, handling dry white lead, or in any work involving exposure to white-lead dusts, shall, while so occupied, wear an overall suit and head covering.

Every person engaged in stripping white beds, or in emptying chambers, or in drawing stoves, or in packing, shall in addition wear a respirator while so occupied.

30. Every person engaged in any place or process named in rule 29 shall, before partaking of meals or leaving the premises, deposit the overalls, head coverings, and respirators in the place appointed by the occupier for the purpose, and shall thoroughly wash face and hands in the lavatory.

31. Every person employed in a lead process shall take a bath at the factory at least once a week, and wash in the lavatory before bathing; having done so he shall at once sign his name in the bath register, with the date.

32. No person employed in a lead process shall smoke or use tobacco in any form or partake of food or drink elsewhere than in the dining room or kitchen.

33. No person shall in any way interfere, without the knowledge and concurrence of the occupier or manager, with the means and appliances provided for the removal of dust.

34. The foreman shall report to the manager, and the manager shall report to the occupier, any instance coming under his notice of a worker neglecting to observe these rules.

35. No person shall obtain employment under an assumed name or under any false pretense.

ARTHUR WHITELEGGE,
Chief Inspector of Factories.
M. W. RIDLEY,
One of His Majesty's Principal Secretaries of State.

1st *June*, 1899.

NOTE.—These rules must be kept posted up in conspicuous places in the factory to which they apply, where they may be conveniently read by the persons employed. Any person who is bound to observe these rules and fails to do so, or acts in contravention of them is liable to a penalty; and in such cases the occupier also is liable to a penalty unless he proves that he has taken all reasonable means by publishing, and to the best of his power, enforcing the rules, to prevent the contravention or noncompliance. (Factory and workshop act, 1901, secs. 85 and 86.)

Red and Orange Lead Works.

[Form 261—February, 1904.]

DUTIES OF OCCUPIERS.

In drawing charges of massicot, or of red lead, or of orange lead, from the furnace they shall not allow the charges of massicot, or of red lead, or of orange lead, to be discharged onto the floor of the factory or workshop, but shall arrange that it be shoveled, not raked, into wagons.

They shall arrange that no red or orange lead shall be packed in the room or rooms where the manufacture is actually carried on.

They shall arrange that no red or orange lead shall be packed in casks or other receptacles except in a place provided with a hood connected with a fan, or shall provide other suitable means to create an effective draft.

They shall provide sufficient bath accommodation for all persons employed in the manipulation of red and orange lead, and lavatories, with a good supply of hot water, soap, nailbrushes, and towels for the use of such persons.

They shall arrange for a monthly visit by a medical man who shall examine every worker individually, and who shall enter the result of each examination in a register book to be provided by the said occupiers.

They shall provide a sufficient supply of approved sanitary drink for the workers.

DUTIES OF PERSONS EMPLOYED.

In case where the cooperation of the workers is required for carrying out the foregoing rules, and where such cooperation is not given, the workers shall be held liable in accordance with the factory and workshop act, 1891, section 9, which runs as follows:

"If any person who is bound to observe any special rules established for any factory or workshop under this act, acts in contravention of, or fails to comply with, any such special rule, he shall be liable on summary conviction to a fine not exceeding £2 ($9.73)."

Yellow Lead.

[Form 263—February, 1904.]

DUTIES OF OCCUPIERS.

They shall provide washing conveniences, with a sufficient supply of hot and cold water, soap, nailbrushes, and towels.

They shall provide respirators and overall suits for the persons employed in all dry processes.

They shall provide fans or other suitable means of ventilation wherever dust is generated in the process of manufacture.

They shall provide a sufficient supply of epsom salts and of an approved sanitary drink.

DUTIES OF PERSONS EMPLOYED.

In cases where the cooperation of the workers is required for carrying out the foregoing rules and where such cooperation is not given, the workers shall be held liable, in accordance with the factory and workshop act, 1891, section 9, which runs as follows:

"If any person who is bound to observe any special rules established for any factory or workshop under this act, acts in contravention of, or fails to comply with, any such special rule, he shall be liable on summary conviction to a fine not exceeding £2 ($9.73)."

Respirators.—A good respirator is a cambric bag with or without a thin flexible wire made to fit over the nose.

Sanitary drink suggested.—Sulphate of magnesia, 2 ounces; water, 1 gallon; essence of lemon, sufficient to flavor.

LEAD SMELTING WORKS.

[Form 264—January, 1906.]

DUTIES OF OCCUPIERS.

They shall provide respirators and overall suits for the use of all persons employed in cleaning the flues, and take means to see that the same are used.

They shall arrange that no person be allowed to remain at work more than two hours at a time in a flue. (A rest of half an hour before reentering will be deemed sufficient.)

They shall provide sufficient bath accommodation for all persons employed in cleaning the flues, and every one so employed shall take a bath before leaving the works.

They shall provide washing conveniences, with a sufficient supply of hot and cold water, soap, nailbrushes, and towels.

DUTIES OF PERSONS EMPLOYED.

In cases where the cooperation of the workers is required for carrying out the foregoing rules, and where such cooperation is not given, the workers shall be held liable, in accordance with the factory and workshop act, 1891, section 9, which runs as follows:

"If any person who is bound to observe any special rules established for any factory or workshop under this act, acts in contravention of, or fails to comply with, any such special rule, he shall be liable on summary conviction to a fine not exceeding £2 ($9.73)."

SPECIAL RULES FOR FACTORIES OR WORKSHOPS IN WHICH YELLOW CHROMATE OF LEAD IS USED, OR IN WHICH GOODS DYED WITH IT UNDERGO THE PROCESSES OF BUILDING OR NODDLING, WINDING, REELING, WEAVING, OR ANY OTHER TREATMENT.

[Form 270—February, 1904.]

DUTIES OF OCCUPIERS.

They shall provide washing conveniences, with a sufficient supply of hot and cold water, soap, nailbrushes, and towels.

They shall provide respirators and overall suits for the persons employed in all dry processes.

They shall provide fans and other suitable means of ventilation wherever dust is generated in the process of manufacture.

They shall provide a sufficient supply of epsom salts, and of the sanitary drink mentioned below, or some other approved by His Majesty's inspector of factories.

Respirators.—A good respirator is a cambric bag with or without a thin flexible wire made to fit over the nose.

Sanitary drink.—Sulphate of magnesia, 2 ounces; water, 1 gallon; essence of lemon, sufficient to flavor.

DUTIES OF PERSONS EMPLOYED.

Every person to whom is supplied a respirator or overall suit shall wear the same when at the special work for which such are provided.

Every person shall carefully clean and wash hands and face before meals and before leaving the works.

No food shall be eaten in any part of the works in which yellow chromate of lead is used in the manufacture.

ARTHUR WHITELEGGE,
H. M. Chief Inspector of Factories.

Under section 9, Factory Act, 1891, any person who is bound to observe any special rules is liable to penalties for noncompliance with such special rules.

AMENDED SPECIAL RULES FOR THE MANUFACTURE AND DECORATION OF EARTHENWARE AND CHINA.

[As established, after arbitration, by the awards of the umpire, Lord James of Hereford, dated 30th of December, 1901, and 28th of November, 1903.]

[Form 923—October, 1905.]

DUTIES OF OCCUPIERS.

1. Deleted.

2. After the 1st day of February, 1904, no glaze shall be used which yields to a dilute solution of hydrochloric acid more than 5 per cent of its dry weight of a soluble lead compound calculated as lead monoxide when determined in the manner described below.

A weighed quantity of dried material is to be continuously shaken for one hour, at the common temperature, with one thousand times its weight of an aqueous solution of hydrochloric acid containing 0.25 per cent of HCl. This solution is thereafter to be allowed to stand for one hour, and to be passed through a filter. The lead salt contained in an aliquot portion of the clear filtrate is then to be precipitated as lead sulphide and weighed as lead sulphate.

If any occupier shall give notice in writing to the inspector for the district that he desires to use glaze which does not conform to the above-mentioned conditions, and to adopt in his factory the scheme of compensation prescribed in Schedule B, and shall affix and keep the same affixed in his factory, the above provisions shall not apply to his factory, but instead thereof the following provisions shall apply:

All persons employed in any process included in Schedule A other than china scouring shall be examined before the commencement of their employment, or at the first subsequent visit of the certifying surgeon, and once in each calendar month by the certifying surgeon of the district.

The certifying surgeon may at any time order by signed certificate the suspension of any such person from employment in any process included in Schedule A other than china scouring, if such certifying surgeon is of opinion that such person by continuous work in lead will incur special danger from the effects of plumbism, and no person after such suspension shall be allowed to work in any process included in Schedule A other than china scouring without a certificate of fitness from the certifying surgeon entered in the register.

Any workman who, by reason of his employment being intermittent or casual, or of his being in regular employment for more than one employer, is unable to present himself regularly for examination by the certifying surgeon, may procure himself at his own expense to be examined once a month by a certifying surgeon, and such examination shall be a sufficient compliance with this rule. The results of such examination shall be entered by the certifying surgeon in a book to be kept in the possession of the workman. He shall produce and show the said book to a factory inspector or to any employer on demand, and he shall not make any entry or erasure therein.

If the occupier of any factory to which this rule applies fails to duly observe the conditions of the said scheme, or if any such factory shall by reason of the occurrence of cases of lead poisoning appear to the secretary of state to be in an unsatisfactory condition, he may, after an inquiry, at which the occupier shall have an opportunity of being heard, prohibit the use of lead for such time and subject to such conditions as he may prescribe.

All persons employed in the processes included in Schedule A, other than china scouring, shall present themselves at the appointed time for examination by the certifying surgeon, as provided in this rule.

In addition to the examinations at the appointed times, any person so employed may at any time present himself to the certifying surgeon for examination, and shall be examined on paying the prescribed fee.

All persons shall obey any directions given by the certifying surgeon.

No person after suspension by the certifying surgeon shall work in any process included in Schedule A, other than china scouring, without a certificate of fitness from the certifying surgeon entered in the register. Any operative who fails without reasonable cause to attend any monthly examination shall procure himself, at his own expense, to be examined within fourteen days thereafter by the certifying surgeon, and shall himself pay the prescribed fee.

A register, in the form which has been prescribed by the secretary of state for use in earthenware and china works, shall be kept, and in it the certifying surgeon shall enter the dates and results of his visits, the number of persons examined, and particulars of any directions given by him. This register shall contain a list of all persons employed in the processes included in Schedule A, or in emptying china biscuit ware, and shall be produced at any time when required by His Majesty's inspectors of factories or by the certifying surgeon.

3. The occupier shall allow any of His Majesty's inspectors of factories to take at any time sufficient samples for analysis of any material in use or mixed for use.

Provided that the occupier may at the time when the sample is taken, and on providing the necessary appliances, require the inspector to take, seal, and deliver to him a duplicate sample.

But no analytical result shall be disclosed or published in any way except such as shall be necessary to establish a breach of these rules.

4. No woman, young person, or child shall be employed in the mixing of unfritted lead compounds in the preparation or manufacture of fritts, glazes, or colors.

5. No person under 15 years of age shall be employed in any process included in Schedule A, or in emptying china biscuit ware.

Thimble picking, or threading up, or looking over biscuit ware shall not be carried on except in a place sufficiently separated from any process included in Schedule A.

6. All women and young persons employed in any process included in Schedule A shall be examined once in each calendar month by the certifying surgeon for the district.

The certifying surgeon may order by signed certificate in the register the suspension of any such women or young persons from employment in any process included in Schedule A, and no person after such suspension shall be allowed to work in any process included in Schedule A without a certificate of fitness from the certifying surgeon entered in the register.

7. A register, in the form which has been prescribed by the secretary of state for use in earthenware and china works, shall be kept, and in it the certifying surgeon shall enter the dates and results of his visits, the number of persons examined in pursuance of rule 6 as amended, and particulars of any directions given by him. This register shall contain a list of all persons employed in the processes included in Schedule A, or in emptying china biscuit ware, and shall be produced at any time when required by His Majesty's inspector of factories or by the certifying surgeon.

8. The occupier shall provide and maintain suitable overalls and head coverings for all women and young persons employed in the processes included in the Schedule A, or in emptying china biscuit ware.

No person shall be allowed to work in any process included in the schedule, or in emptying china biscuit ware, without wearing suitable overalls and head coverings, provided that nothing in this rule shall render it obligatory on any person engaged in drawing glost ovens to wear overalls and head coverings.

All overalls, head coverings, and respirators, when not in use or being washed or repaired, shall be kept by the occupier in proper custody. They shall be washed or renewed at least once a week, and suitable arrangements shall be made by the occupier for carrying out these requirements.

A suitable place, other than that provided for the keeping of overalls, head coverings, and respirators, in which all the above workers can deposit clothing put off during working hours, shall be provided by the occupier.

Each respirator shall bear the distinguishing mark of the worker to whom it is supplied.

9. No person shall be allowed to keep, or prepare, or partake of any food, or drink, or tobacco, or remain during meal times in a place in which is carried on any process included in Schedule A.

The occupier shall make suitable provision to the reasonable satisfaction of the inspector in charge of the district for the accommodation during meal times of persons employed in such places or processes, with a right of appeal to the chief inspector of factories. Such accommodation shall not be provided in any room or rooms in which any process included in Schedule A is carried on, and no washing conveniences mentioned hereafter in rule 13 shall be maintained in any room or rooms provided for such accommodations.

Suitable provision shall be made for the deposit of food brought by the workers.

10. The processes of the towing of earthenware, china scouring, ground laying, ware cleaning after the dipper, color dusting, whether on glaze or under-glaze, color blowing, whether on glaze or under-glaze, glaze blowing, or transfer making, shall not be carried on without the use of exhaust fans, or other efficient means for the effectual removal of dust, to be approved in each particular case by the secretary of state, and other such conditions as he may from time to time prescribe.

In the process of ware cleaning after the dipper, sufficient arrangements shall be made for any glaze scraped off which is not removed by the fan, or the other efficient means, to fall into water.

In the process of ware cleaning of earthenware after the dipper, damp sponges or other damp material shall be provided in addition to the knife or other instrument, and shall be used wherever practicable.

Flat-knocking and fired-flint sifting shall be carried on only in inclosed receptacles, which shall be connected with an efficient fan or other efficient draft, unless so contrived as to prevent effectually the escape of injurious dust.

In all processes the occupier shall, as far as practicable, adopt efficient measures for the removal of dust and for the prevention of any injurious effects arising therefrom.

11. No person shall be employed in the mixing of unfritted lead compounds, in the preparation or manufacture of fritts, glazes, or colors containing lead without wearing a suitable and efficient respirator provided and maintained by the employer, unless the mixing is performed in a closed machine or the materials are in such a condition that no dust is produced.

Each respirator shall bear the distinguishing mark of the worker to whom it is supplied.

12. All drying stoves as well as all workshops and all parts of factories shall be effectually ventilated to the reasonable satisfaction of the inspector in charge of the district.

13. The occupier shall provide and continually maintain sufficient and suitable washing conveniences for all persons employed in the processes included in Schedule A, as near as practicable to the places in which such persons are employed.

The washing conveniences shall comprise soap, nailbrushes, and towels, and at least one wash hand basin for every five persons employed as above, with a constant supply of water laid on, with one tap at least for every two basins, and conveniences for emptying the same and running off the waste water on the spot down a waste pipe.

There shall be in front of each washing basin, or convenience, a space for standing room which shall not be less in any direction than 21 inches.

14. The occupier shall see that the floors of workshops and of such stoves as are entered by the work people are sprinkled and swept daily; that all rust, scraps, ashes, and dirt are removed daily, and that the mangles, workbenches, and stairs leading to workshops are cleaned weekly.

When so required by the inspector in charge of the district, by notice in writing, any such floors, mangles, workbenches, and stairs shall be cleansed in such manner and at such times as may directed in such notice.

As regards every potter's shop and stove, and every place in which any process included in Schedule A is carried on, the occupier shall cause the sufficient cleansing of floors to be done at a time when no other work is being carried on in such room, and in the case of potters' shops, stoves, dipping houses, and majolica painting rooms, by an adult male.

Provided that in the case of rooms in which ground laying or glost placing is carried on, or in china dippers' drying room, the cleansing prescribed by this rule may be done before work commences for the day, but in no case shall any work be carried on in the room within one hour after any such cleansing as aforesaid has ceased.

15. The occupier shall cause the boards used in the dipping house, dippers' drying room, or glost placing shop to be cleansed every week, and shall not allow them to be used in any other department, except after being cleansed.

When so required by the inspector in charge of the district, by notice in writing, any such boards shall be washed at such times as may be directed in such notice.

DUTIES OF PERSONS EMPLOYED.

16. All women and young persons employed in the processes included in Schedule A shall present themselves at the appointed time for examination by the certifying surgeon as provided in rule 6 as amended.

No person after suspension by the certifying surgeon shall work in any process included in the schedule without a certificate of fitness from the certifying surgeon entered in the register.

17. Every person employed in any process included in Schedule A, or in emptying china biscuit ware, shall, when at work, wear a suitable overall and head covering, and also a respirator when so required by rule 11 as amended, which shall not be worn outside the factory or workshop and which shall not be removed therefrom, except for the purpose of being washed or repaired. Such overall and head covering shall be in proper repair and duly washed.

The hair must be so arranged as to be fully protected from dust by the head covering.

The overalls, head coverings, and respirators, when not being worn, and clothing put off during working hours, shall be deposited in the respective places provided by the occupier for such purposes under rule 8 as amended.

18. No person shall remain during meal times in any place in which is carried on any process included in Schedule A, or introduce, keep, prepare, or partake of any food or drink or tobacco therein at any time.

19. No person shall in any way interfere, without the knowledge and concurrence of the occupier or manager, with the means and appliances provided by the employers for the ventilation of the workshops and stoves, and for the removal of dust.

20. No person included in any process included in Schedule A shall leave the works or partake of meals without previously and carefully cleaning and washing his or her hands.

No person employed shall remove or damage the washing basins or conveniences provided under rule 13.

20a. The persons appointed by the occupiers shall cleanse the several parts of the factory regularly, as prescribed in rule 14.

Every worker shall so conduct his or her work as to avoid, as far as practicable, making or scattering dust, dirt, or refuse, or causing accumulation of such.

21. The boards used in the dipping house, dippers' drying room, or glost placing shop shall not be used in any other department, except after being cleansed, as directed in rule 15.

EXEMPTION FOR PROCESSES IN WHICH NO LEAD OR OTHER POISONOUS MATERIAL IS USED.

22. If the occupier of a factory to which these rules apply gives with reference to any process included in Schedule A, other than china scouring, an undertaking that no lead or lead compound or other poisonous material shall be used, the chief inspector may approve in writing of the suspension of the operation of rules 4, 5, 6, 7, 8, 15, 16, 17, and 21, or any of them in such process; and thereupon such rules shall be suspended as regards the process named in the chief inspector's approval, and in lieu thereof the following rule shall take effect, viz, No lead or lead compound or other poisonous material shall be used in any process so named.

For the purpose of this rule materials that contain no more than 1 per cent of lead shall be regarded as free from lead.

NOTE.—These rules must be kept posted up in conspicuous places in the factory to which they apply, where they may be conveniently read by persons employed. Any person who is bound to observe these rules and fails to do so, or acts in contravention to them, is liable to a penalty, and in such cases the occupier also is liable to a penalty unless he proves that he has taken all reasonable means, by publishing and to the best of his power enforcing the rules, to prevent the contravention or non-compliance.

Schedule A.

Dipping or other process carried on in the dipping house.
Glaze blowing.
Painting in majolica or other glaze.

Drying after dipping.
Ware cleaning after the application of glaze by dipping or other process.
China scouring.
Glost placing.
Ground laying.
Color dusting } whether on-glaze or under-glaze.
Color blowing }
Lithographic transfer making.
Making or mixing of fruits, glazes, or colors containing lead.
Any other process in which materials containing lead are used or handled in the dry state, or in the form of spray, or in suspension in liquid other than oil or similar medium.

SCHEDULE A.—*Notice to workmen employed in process named in Schedule A, other than china scouring.*

CONDITIONS OF COMPENSATION.

1. Where a workman is suspended from working by a certifying surgeon of the district on the ground that he is of opinion that such person by continued work in lead will incur special danger from the effects of plumbism, and the certifying surgeon shall certify that in his opinion he is suffering from plumbism arising out of his employment, he shall, subject as hereinafter mentioned, be entitled to compensation from his employer as hereinafter provided.

(*a*) If any workman who has been suspended as aforesaid dies within nine calendar months from the date of such certificate of suspension, by reason of plumbism contracted before said date, there shall be paid to such of his dependents as are wholly dependent upon his earnings at the time of his death or upon the weekly compensation payable under this scheme, a sum equal to the amount he has earned during a period of three years next preceding the date of the said certificate, such sum not to be more than £300 ($1,459.95) nor less than £150 ($729.98) for an adult male, £100 ($486.65) for an adult female, and £75 ($364.99) for a young person.

(*b*) If the workman does not leave any dependents wholly dependent as aforesaid, but leaves any dependents in part dependent as aforesaid, a reasonable part of that sum.

(*c*) If he leaves no dependents, the reasonable expenses of his medical attendance and burial, not exceeding £10.

2. With respect to such payments the following provisions shall apply—

(*a*) All sums paid to the workmen as compensation since the date of the said certificate shall be deducted from the sums payable to the dependents.

(*b*) The payment shall, in case of death, be made to the legal personal representative of the workingman, or, if he has no legal personal representative, to or for the benefit of his dependents, or, if he leaves no dependents, to the person to whom the expenses are due; and if made to the legal personal representative, shall be paid by him to or for the benefit of the dependents or other person entitled thereto.

(*c*) Any question as to who is a dependent, or as to the amount payable to each dependent, shall, in default of agreement, be settled by arbitration as hereinafter provided in clause 9.

(*d*) The sum allotted as compensation to a dependent may be invested or otherwise applied for the benefit of the person entitled thereto, as agreed, or as ordered by the arbitrator.

(*e*) Any sum which is agreed or is ordered by the arbitrator to be invested may be invested in whole or in part in the post-office savings bank.

3. Where a workman has been suspended and certified as provided in condition 1, and while he is totally or partially prevented from earning a living by reason of such suspension, he shall be entitled to a weekly payment not exceeding 50 per cent of his average weekly earnings at the time of such suspension, such payment not to exceed £1 ($4.87). The average may be taken over such period, not exceeding twelve months, as appears fair or reasonable, having regard to all the circumstances of the case.

4. In fixing these weekly payments regard shall be had to the difference between the amount of the average weekly earnings of the workman at the time of his suspension and the average amount, if any, which it is estimated that he will be able to earn afterwards in any occupation or employment, and to any payments (not being wages) which he may have received from the employer in

respect of the suspension, and to all the circumstances of the case, including his age and expectation of life.

5. If it shall appear that any workman has persistently disobeyed the special rules or the directions given for his protection by his employers, and that such disobedience has conduced to his suspension, or has not presented himself for examination by the certifying surgeon, or has failed to give full information and assistance as provided in condition 6, his conduct may be taken into consideration in assessing the amount of the weekly payments.

6. It shall be the duty of every workman at all times to submit to medical examination when required and to give full information to the certifying surgeon and to assist to the best of his power in the obtaining of all facts necessary to enable his physical condition to be ascertained.

7. Any weekly payment may be reviewed at the request either of the employer or of the workman, and on such review may be ended, diminished, or increased, subject to the maximum above provided, and the amount of payment shall, in default of agreement, be settled by arbitration.

8. Any workman receiving weekly payments under this scheme shall submit himself, if required, for examination by a duly qualified medical practitioner provided and paid by the employer.

If the workman refuses to submit himself to such examination or in any way obstructs the same, his right to such weekly payments shall be suspended until such examination has taken place.

9. If any dispute shall arise as to any certificate of the certifying surgeon or as to the amount of compensation payable as herein provided, or otherwise in relation to these provisions, the same shall be decided by an arbitrator to be appointed by the employer and workman, or in default of agreement by the secretary of state. The said arbitrator shall have all the powers of an arbitrator under the arbitration act, and his decision shall be final.

The fee of the arbitrator shall be fixed by the secretary of state, and shall be paid as the arbitrator shall direct.

10. No compensation shall be payable under these provisions unless notice of claim in writing is made within six weeks of the date of the certificate of suspension, or of the death, provided that the want of such notice shall not bar the claim if in the opinion of the arbitrator there was reasonable excuse for the want of it.

A claim for compensation by any workman whose employment is intermittent, or casual, or who is regularly employed by more than one employer, shall only arise against the employers for whom he has worked in a process included in Schedule A within one month prior to his suspension. The said employers shall bear the compensation among them in such proportion as in default of agreement shall be determined by an arbitrator as herein provided.

11. "Employer" includes an occupier, a corporation, and the legal representatives of a deceased employer. "Workman" includes every person, male or female, whether his agreement be one of service or apprenticeship or otherwise, and is expressed or implied, orally, or in writing, and shall include the personal representatives of a deceased workman. "Dependents" has the same meaning as in the workmen's compensation act, 1897.

The terms contained in this notice shall be deemed to be part of the contract of employment of all workmen in the above-named process.

Electric Accumulators.

Whereas the manufacture of electric accumulators has been certified in pursuance of section 79 of the factory and workshop act, 1901, to be dangerous;

I hereby, in pursuance of the powers conferred on me by that act, make the following regulations, and direct that they shall apply to all factories and workshops or parts thereof in which electric accumulators are manufactured.

In these regulations "lead process" means pasting, casting, lead burning, or any work involving contact with dry compounds of lead.

Any approval given by the chief inspector of factories in pursuance of these regulations shall be given in writing, and may at any time be revoked by notice in writing signed by him.

DUTIES OF OCCUPIER.

1. Every room in which casting, pasting, or lead burning is carried on shall contain at least 500 cubic feet of air space for each person employed therein, and in computing this air space, no height above 14 feet shall be taken into account.

These rooms and that in which the plates are formed shall be capable of thorough ventilation. They shall be provided with windows made to open.

2. Each of the following processes shall be carried on in such manner and under such conditions as to secure effectual separation from one another and from any other process:

(*a*) Manipulation of dry compounds of lead.

(*b*) Pasting.

(*c*) Formation, and lead burning necessarily carried on therewith.

(*d*) Melting down of old plates.

Provided that manipulation of dry compounds of lead carried on as in regulation 5 (*b*) need not be separated from pasting.

3. The floors of the rooms in which manipulation of dry compounds of lead or pasting is carried on shall be of cement or similar impervious material, and shall be kept constantly moist while work is being done.

The floors of these rooms shall be washed with a hose pipe daily.

4. Every melting pot shall be covered with a hood and shaft so arranged as to remove the fumes and hot air from the workrooms.

Lead ashes and old plates shall be kept in receptacles specially provided for the purpose.

5. Manipulation of dry compounds of lead in the mixing of the paste or other processes shall not be done except (*a*) in any apparatus so closed, or so arranged with an exhaust draft, as to prevent the escape of dust into the workroom; or, (*b*) at a bench provided with (1) efficient exhaust draft and air guide so arranged as to draw the dust away from the worker, and (2) a grating on which each receptacle of the compound of lead in use at the time shall stand.

6. The benches at which pasting is done shall be covered with sheet lead or other impervious material, and shall have raised edges.

7. No woman, young person, or child shall be employed in the manipulation of dry compounds of lead or in pasting.

8. (*a*) A duly qualified medical practitioner (in these regulations referred to as the "appointed surgeon"), who may be the certifying surgeon, shall be appointed by the occupier, such appointment unless held by the certifying surgeon to be subject to the approval of the chief inspector of factories.

(*b*) Every person employed in a lead process shall be examined once a month by the appointed surgeon, who shall have power to suspend from employment in any lead process.

(*c*) No person after such suspension shall be employed in a lead process without written sanction entered in the health register by the appointed surgeon. It shall be sufficient compliance with this regulation for a written certificate to be given by the appointed surgeon and attached to the health register, such certificate to be replaced by a proper entry in the health register at the appointed surgeon's next visit.

(*d*) A health register in a form approved by the chief inspector of factories shall be kept, and shall contain a list of all persons employed in lead processes. The appointed surgeon will enter in the health register the dates and results of his examinations of the persons employed and particulars of any directions given by him. He shall on a prescribed form furnish to the chief inspector of factories on the 1st day of January in each year a list of the persons suspended by him during the previous year, the cause and duration of such suspension, and the number of examinations made.

The health register shall be produced at any time when required by His Majesty's inspectors of factories or by the certifying surgeon or by the appointed surgeon.

9. Overalls shall be provided for all persons employed in manipulating dry compounds of lead or in pasting.

The overalls shall be washed or renewed once every week.

10. The occupier shall provide and maintain—

(*a*) A cloakroom in which workers can deposit clothing put off during working hours. Separate and suitable arrangements shall be made for the storage of the overalls required in regulation 9.

(*b*) A dining room unless the factory is closed during meal hours.

11. No person shall be allowed to introduce, keep, prepare, or partake of any food, drink, or tobacco, in any room in which a lead process is carried on. Suitable provision shall be made for the deposit of food brought by the workers.

This regulation shall not apply to any sanitary drink provided by the occupier and approved by the appointed surgeon.

12. The occupier shall provide and maintain for the use of the persons employed in lead processes a lavatory, with soap, nailbrushes, towels, and at least one lavatory basin for every five such persons. Each such basin shall be provided with a waste pipe, or the basins shall be placed on a trough fitted with a waste pipe. There shall be a constant supply of hot and cold water laid onto each basin.

Or, in the place of basins the occupier shall provide and maintain troughs of enamel or similar smooth impervious material, in good repair, of a total length of 2 feet for every five persons employed, fitted with waste pipes, and without plugs, with a sufficient supply of warm water constantly available.

The lavatory shall be kept thoroughly cleansed and shall be supplied with a sufficient quantity of clean towels once every day.

13. Before each meal and before the end of the day's work, at least ten minutes, in addition to the regular meal times, shall be allowed for washing to each person who has been employed in the manipulation of dry compounds of lead or in pasting.

Provided that if the lavatory accommodation specially reserved for such persons exceeds that required by regulation 12, the time allowance may be proportionately reduced, and that if there be one basin or 2 feet of trough for each such person this regulation shall not apply.

14. Sufficient bath accommodation shall be provided for all persons engaged in the manipulation of dry compounds of lead or in pasting, with hot and cold water laid on, and a sufficient supply of soap and towels.

This rule shall not apply if in consideration of the special circumstances of any particular case, the chief inspector of factories approves the use of local public baths when conveniently near, under the conditions (if any) named in such approval.

15. The floors and benches of each workroom shall be thoroughly cleansed daily at a time when no other work is being carried on in the room.

DUTIES OF PERSONS EMPLOYED.

16. All persons employed in lead processes shall present themselves at the appointed times for examination by the appointed surgeon as provided in regulation 8.

No person after suspension shall work in a lead process, in any factory or workshop in which electric accumulators are manufactured, without written sanction entered in the health register by the appointed surgeon.

17. Every person employed in the manipulation of dry compounds of lead or in pasting shall wear the overalls provided under regulation 9. The overalls, when not being worn, and clothing put off during working hours, shall be deposited in the places provided under regulation 10.

18. No person shall introduce, keep, prepare, or partake of any food, drink (other than any sanitary drink provided by the occupier and approved by the appointed surgeon), or tobacco in any room in which a lead process is carried on.

19. No person employed in a lead process shall leave the premises or partake of meals without previously and carefully cleaning and washing the hands.

20. Every person employed in the manipulation of dry compounds of lead or in pasting shall take a bath at least once a week.

21. No person shall in any way interfere, without the concurrence of the occupier or manager, with the means and appliances provided for the removal of the dust or fumes, and for the carrying out of these regulations.

These regulations shall come into force on the 1st day of January, 1904.

A. AKERS-DOUGLAS,
One of His Majesty's Principal Secretaries of State.

HOME OFFICE, *Whitehall, 21st November, 1903.*

WORKS OR PARTS OF WORKS, IN WHICH LEAD, ARSENIC, OR ANTIMONY IS USED IN THE ENAMELING OF IRON PLATES.

[Form 251—January, 1906.]

Duties of occupiers.

1. They shall provide washing conveniences with a sufficient supply of hot and cold water, soap, nailbrushes, and towels, and take measures to secure that every worker wash face and hands before meals and before leaving the works.

2. They shall provide suitable respirators, overall suits, and head coverings for all workers employed in the processes of grinding, dusting, and brushing.

3. They shall adopt measures on and after the 1st day of October, 1904, in the dusting and brushing processes for the removal of all superfluous dust, by the use of perforated benches or tables supplied with fans to carry the dust down through the apertures of such benches or tables, the underpart of which must be boxed in.

4. They shall provide a sufficient supply of approved sanitary drink, and shall cause the work people to take it.

5. They shall arrange for a medical inspection of all persons employed, at least once a month.

They shall see that no female is employed without previous examination and a certificate of fitness from the medical attendant of the works.

They shall see that no person who has been absent from work through illness shall be reemployed without a medical certificate to the effect that he or she has recovered.

6. Upon any person employed in the works complaining of being unwell, the occupier shall, with the least possible delay, and at his own expense, give an order upon a doctor for professional attendance and medicine. It is to be understood that this rule will not apply to persons suffering from complaints which have not been contracted in the process of manufacture.

7. They shall provide a place or places free from dust and damp in which the operatives can hang up the clothes in which they do not work.

(It is recommended that they shall provide for each female before the day's work begins some light refreshment, such as a half pint of milk and a biscuit.)

DUTIES OF PERSONS EMPLOYED.

8. Every person to whom is supplied a respirator or overall and head covering shall wear the same when at the work for which such are provided.

9. Every person shall carefully clean and wash hands and face before meals, and before leaving the works.

10. No food shall be eaten by any person in any part of the works except in the apartment specially provided for the purpose.

11. No person may seek employment under an assumed name or under any false pretense.

Respirators.—A good respirator is a cambric bag with or without a thin flexible wire made to fit over the nose.

Sanitary drink suggested.—Sulphate of magnesia, 2 ounces; water, 1 gallon; essence of lemon, sufficient to flavor.

ARTHUR WHITELEGGE,
His Majesty's Chief Inspector of Factories.

NOTE.—These rules must be kept posted up in conspicuous places in the factory to which they apply, where they may be conveniently read by the persons employed. Any person who is bound to observe these rules and fails to do so or acts in contravention of them, is liable to a penalty; and in such case the occupier also is liable to a penalty unless he proves that he has taken all reasonable means by publishing and, to the best of his power, enforcing the rules to prevent the contravention or noncompliance.

WORKS IN WHICH LEAD OR ARSENIC IS USED IN THE TINNING AND ENAMELING OF METAL HOLLOW WARE AND COOKING UTENSILS.

[Form 385—March, 1906.]

DUTIES OF OCCUPIERS.

They shall provide washing conveniences with a sufficient supply of hot and cold water, soap, nailbrushes, and towels, and take measures to secure that every worker wash face and hands before meals and before leaving the works.

They shall see that no food is eaten in any room where the process of tinning or enameling is carried on.

DUTIES OF PERSONS EMPLOYED.

Every worker shall wash face and hands before meals and before leaving the works.

No worker shall eat food in any room where the process of tinning or enameling is carried on.

ARTHUR WHITELEGGE,
His Majesty's Chief Inspector of Factories.

NOTE.—These rules must be kept posted up in conspicuous places in the factory to which they apply, where they may be conveniently read by the persons employed. Any person who is bound to observe these rules and fails to do so or acts in contravention of them, is liable to a penalty, and in such case the occupier also is liable to a penalty unless he proves that he has taken all reasonable means by publishing and, to the best of his power, enforcing the rules to prevent the contravention or noncompliance.

PROCESSES IN THE MANUFACTURE OF PAINTS AND COLORS AND IN THE EXTRACTION OF ARSENIC.

[Form 249—June, 1904.]

DUTIES OF OCCUPIERS.

1. They shall provide washing conveniences, with a sufficient supply of hot and cold water, soap, nailbrushes, and towels, and take measures to secure that every worker wash face and hands before meals and before leaving the works; and, in addition to the above, sufficient bath accommodation for the use of all persons employed in the manufacture of Milan red, vermilionette, or Persian red,

2. They shall provide suitable respirators and overall suits, kept in a cleanly state, for all workers engaged in any department where dry white lead or arsenic is used in either the manufacture or paint mixing, and overall suits for those engaged in grinding in water or oil, and for all workers in Milan red, vermilionette, or Persian red, wherever dust is generated.

3. They shall provide a sufficient supply of approved sanitary drink, which shall be accessible to the workers at all times, and shall cause such approved sanitary drink to be taken daily by workers in any department where white lead or arsenic is used in the manufacture, and shall provide a supply of aperient medicine, which shall be given to the workers, when required, free of charge.

4. No food shall be eaten in any part of the works where white lead or arsenic is used in the manufacture.

DUTIES OF PERSONS EMPLOYED.

5. Every person to whom is supplied a respirator or overall suit shall wear the same when at the special work for which such are provided.

6. Every person shall carefully clean and wash hands and face before meals and before leaving the works.

7. No food shall be eaten in any part of the works in which white lead or arsenic is used in the manufacture.

8. No person shall smoke or use tobacco in any part of the works in which white lead or arsenic is used in the manufacture.

ARTHUR WHITELEGGE,
His Majesty's Chief Inspector of Factories.

NOTE.—These rules must be kept posted up in conspicuous places in the works to which they apply, where they may be conveniently read by the persons employed. Any person who is bound to observe these rules and fails to do so or acts in contravention of them, is liable to a penalty; and in such case the occupier also is liable to a penalty unless he proves that he has taken all reasonable means by publishing and, to the best of his power, enforcing the rules to prevent the contravention or noncompliance.

PROCESSES IN THE MIXING AND CASTING BRASS, GUN METAL, BELL METAL, WHITE METAL, DELTA METAL, PHOSPHOR BRONZE, AND MANILA MIXTURE.

[Form 271—February, 1904.]

DUTIES OF OCCUPIERS.

1. They shall provide adequate means for facilitating, as far as possible, the emission or escape from the shop of any noxious fumes or dust arising from the above-named processes. Such means shall include the provision of traps or of louver gratings in the roof or ceiling of any shop in which such processes, or either of them, is or are carried on; or in case of a mixing or casting shop which is situated under any other shop, there shall be provided an adequate flue or shaft (other than any flue or shaft in connection with a furnace or fireplace) to carry any fumes from the mixing or casting shop, by or through any such shop that may be situated above it.

2. They shall cause all such mixing or casting shops, whether defined as factories or workshops under the factory and workshop act, 1878, to be cleaned down and limewashed once at least within every twelve months, or once within every six months is so required by notice in writing from His Majesty's inspector of factories and workshops, dating from the time when these were last thus cleaned down and limewashed; and they shall record the dates of such cleaning down and limewashing in a prescribed form of register.

3. They shall provide a sufficient supply of metal basins, water, and soap for the use of all persons employed in such mixing or casting shops.

4. They shall not employ or allow within their factory or workshop the employment of any woman or female young person, in any process whatever, in any such mixing or casting shop, or in any portion thereof which is not entirely separated by a partition extending from the floor to the ceiling.

DUTIES OF PERSONS EMPLOYED.

5. They shall not partake of or cook any food in any such mixing or casting shop within a period of at least ten minutes after the completion of the last pouring of metal in that shop.

ARTHUR WHITELEGGE,
His Majesty's Chief Inspector of Factories.

JULY 10, 1906.

Women and young persons under 18 years of age must not be allowed to take a meal in any casting shop or to remain there during the time stated on the notice affixed in the works as being allowed for meals.

These rules must be kept posted up in conspicuous places in the works to which they apply, where they may be conveniently read by the persons employed.

Any person who is bound to observe these rules and fails to do so or acts in contravention of them, is liable to a penalty; and in such case the occupier also is liable to a penalty unless he proves that he has taken all reasonable means, by publishing and to the best of his power enforcing the rules, to prevent the contravention or noncompliance.

CHEMICAL WORKS.

[Form 258—Reprinted December, 1901.]

1. In future every uncovered pot, pan, or other structure containing liquid of a dangerous character, shall be so constructed as to be at least 3 feet in height above the ground or platform. Those already in existence which are less than 3 feet in height, or in cases where it is proved to the satisfaction of an inspector that a height of 3 feet is impracticable, shall be securely fenced.

2. There shall be a clear space around such pots, pans, or other structures, or where any junction exists a barrier shall be so placed as to prevent passage.

3. Caustic pots shall be of such construction that there shall be no footing on the top or sides of the brickwork, and dome-shaped lids shall be used where possible.

4. No unfenced planks or gangways shall be placed across open pots, pans, or other structures containing liquid of a dangerous character. This rule shall not apply to black ash vats where the vats themselves are otherwise securely fastened.

5. Suitable respirators shall be provided for the use of the workers in places where poisonous gases or injurious dust may be inhaled.

6. The lighting of all dangerous places shall be made thoroughly efficient.

7. Every place where caustic soda or caustic potash is manufactured shall be supplied with syringes or wash bottles, which shall be inclosed in covered boxes fixed in convenient places, in the proportion of one to every four caustic pots. They shall be of suitable form and size, and be kept full of clean water. Similar appliances shall be provided wherever, in the opinion of an inspector, they may be desirable.

8. Overalls, kept in a cleanly state, shall be provided for all workers in any room where chlorate of potash or other chlorate is ground. In every such room a bath shall be kept ready for immediate use.

In every chlorate mill, tallow or other suitable lubricant shall be used instead of oil.

9. Respirators charged with moist oxide of iron or other suitable substance, shall be kept in accessible places ready for use in cases of emergency arising from the sulphuretted hydrogen or other poisonous gases.

10. In salt cake departments suitable measures shall be adopted by maintaining a proper draft and by other means to obviate the escape of low-level gases.

11. Weldon bleaching powder chambers, after the free gas has, as far as may be practicable, been drawn off or absorbed by fresh lime, shall, before being opened, be tested by the standard recognized under the alkali act. Such tests shall be duly entered in a register kept for the purpose.

All chambers shall be ventilated as far as possible, when packing is being carried on, by means of open doors on opposite sides and openings in the roof so as to allow of a free current of air.

12. In cases where the cooperation of the workers is required for carrying out the foregoing rules, and where such cooperation is not given, the workers shall be held liable in accordance with the factory and workshop act, 1891, section 9, which runs as follows: "If any person who is bound to observe any special rules, established for any factory or workshop under this act, acts in contravention of, or fails to comply with, any such special rule, he shall be liable on summary conviction to a fine not exceeding £2 ($9.73)."

ARTHUR WHITELEGGE,
His Majesty's Chief Inspector of Factories.

AMENDED SPECIAL RULES FOR CHEMICAL WORKS IN WHICH IS CARRIED ON THE MANUFACTURE OF BICHROMATE OR CHROMATE OF POTASSIUM OR SODIUM.

[Form 260—January, 1906.]

In these rules "persons employed in a chromo process" means a person who is employed in any work involving contact with chromate or bichromate of potassium or sodium, or involving exposure to dust or fumes arising from the manufacture thereof.

Any approval given by the chief inspector in pursuance of rule 10 shall be given in writing, and may at any time be revoked by notice in writing signed by him.

DUTIES OF OCCUPIERS.

1. No uncovered pot, pan, or other structure containing liquid of a dangerous character shall be so constructed as to be less than 3 feet in height above the adjoining ground or platform.

This rule shall not apply to any pot, pan, or other structure constructed before January 1, 1890, or in which a height of 3 feet is impracticable by reason of the nature of the work to be carried on, provided in either case that the structure is securely fenced.

2. There shall be a clear space round all pots, pans, or other structures containing liquid of a dangerous character, except where any junction exists, in which case a barrier shall be so placed as to prevent passage.

3. No unfenced plank or gangway shall be placed across any pot, pan, or other structure containing liquid of a dangerous character.

4. The lighting of all dangerous places shall be made thoroughly efficient.

5. The grinding, separating, and mixing of the raw materials (including chrome ironstone, lime, and sodium and potassium carbonate) shall not be done without such appliances as will prevent, as far as possible, the entrance of dust into the workrooms.

6. "Batches," when withdrawn from the furnaces, shall either be placed in the keaves or vats while still warm, or be allowed to cool in barrows or other receptacles.

7. Evaporating vessels shall be covered in, and shall be provided with ventilating shafts to carry the steam into the outside air.

8. Packing or crushing of bichromate of potassium or sodium shall not be done except under conditions which secure either the entire absence of dust or its effectual removal by means of a fan.

9. No child or young person shall be employed in a chrome process.

10. The occupier shall, subject to the approval of the chief inspector, appoint a duly qualified medical practitioner (in these rules referred to as the appointed surgeon), who shall examine all persons employed in chrome processes at least once in every month, and shall undertake any necessary medical treatment of disease contracted in consequence of such employment, and shall, after the 30th day of April, 1900, have power to suspend any such person from work in any place or process.

(*b*) No person after such suspension shall be employed in any chrome process without the written sanction of the appointed surgeon.

(*c*) A register shall be kept in a form approved by the chief inspector, and shall contain a list of all persons employed in any chrome process. The appointed surgeons shall enter in the register the dates and results of his examinations of the persons employed and particulars of any treatment prescribed by him. The register shall be produced at any time when required by His Majesty's inspectors of factories or by the appointed surgeon.

11. Requisites (approved by the appointed surgeon) for treating slight wounds and ulcers shall be kept at hand and be placed in charge of a responsible person.

12. The occupier shall provide sufficient and suitable overall suits for the use of all persons engaged in the processes of grinding the raw materials, and sufficient and suitable overall suits or other adequate means of protection approved in writing by the appointed surgeon, for the use of all persons engaged in the crystal department or in packing.

Respirators approved by the appointed surgeon shall be provided for the use of all persons employed in packing or crushing bichromate of sodium or potassium.

At the end of every day's work they shall be collected and kept in proper custody in a suitable place set apart for the purpose.

The overalls and respirators shall be thoroughly washed or renewed every week.

13. The occupier shall provide and maintain a cloakroom in which workers can deposit clothing put off during working hours.

14. The occupier shall provide and maintain a lavatory for the use of the persons employed in chrome processes; with soap, nailbrushes, and towels, and a constant supply of hot and cold water laid onto each basin. There shall be at least one lavatory basin for every five persons employed in the crystal department and in packing. Each such basin shall be fitted with a waste pipe, or shall be placed in a trough fitted with waste pipe.

15. The occupier shall provide and maintain sufficient baths and dressing rooms for all persons employed in chrome processes, with hot and cold water laid on, and a sufficient supply of soap and towels; and shall cause each person employed in the crystal department and in packing to take a bath once a week at the factory.

A bath register shall be kept containing a list of all persons employed in the crystal department and in packing, and an entry of the date when each person takes a bath.

The bath register shall be produced at any time when required by His Majesty's inspectors of factories.

16. The floors, stairs, and landings shall be cleaned daily.

DUTIES OF PERSONS EMPLOYED.

17. No person shall deposit a "batch" when withdrawn from the furnace upon the floor nor transfer it to the keaves or vats otherwise than as prescribed in rule 6.

18. No person shall pack or crush bichromate of potassium or sodium otherwise than as prescribed in rule 8.

19. (*a*) Every person employed in a chrome process shall present himself at the appointed times for examination by the appointed surgeon as provided in rule 10.

(*b*) After the 30th day of April, 1900, no person suspended by the appointed surgeon shall work in a chrome process without his written sanction.

20. Every person engaged in the processes of grinding the raw materials shall wear an overall suit, and every person engaged in the crystal department or in packing shall wear an overall suit or other adequate means of protection approved by the appointed surgeon.

Every person employed in packing or crushing bichromate of sodium or potassium shall in addition wear a respirator while so occupied.

21. Every person employed in the processes named in rule 20 shall before leaving the premises deposit the overalls and respirators in the place appointed by the occupier for the purpose, and shall thoroughly wash face and hands in the lavatory.

22. Every person employed in the crystal department and in the packing shall take a bath at the factory at least once a week; and, having done so, shall at once sign his name in the bath register, with the date.

23. The foreman shall report to the manager any instance coming under his notice of a workman neglecting to observe these rules.

ARTHUR WHITELEGGE,
Chief Inspector of Factories.
M. W. RIDLEY,
One of Her Majesty's Principal Secretaries of State.

FEBRUARY, 1900.

NOTE.—These rules must be kept posted up in conspicuous places in the factory to which they apply, where they may be conveniently read by the persons employed. Any person who is bound to observe these rules and fails to do so or acts in contravention of them, is liable to penalty; and in such cases the occupier also is liable to a penalty unless he proves that he has taken all reasonable means by publishing and, to the best of his power, enforcing the rules, to prevent the contravention or noncompliance.

MANUFACTURE OF EXPLOSIVES IN WHICH DI-NITRO-BENZOLE IS USED.

[Form 257—December, 1904.]

1. No person to be employed without a medical certificate, stating that he or she is physically fit for such employment.

2. An examination of the workers at their work to be made at least once a fortnight by a certifying surgeon, who shall have power to order temporary suspension or total change of work for any person showing symptoms of suffering from the poison, or if after a fair trial he is of opinion that any person is by constitution unfit, he shall direct that such person shall cease to be employed.

3. A supply of fresh milk, and of any drug that the medical officer may consider desirable, shall be kept where the workers in his opinion may require it.

4. No meals to be taken in the workrooms.

5. There shall be provided separate lavatories for men and women, with a good supply of hot water, soap, nailbrushes, and towels, and whenever the skin has come in contact with di-nitro-benzole, the part shall be immediately washed.

6. Overall suits and head coverings shall be supplied to all workers in shops where di-nitro-benzole is used, these suits to be taken off or well brushed before meals and before leaving the works, and to be washed at least once a week.

7. Suitable respirators (capable of being washed), folds of linen, or woolen material of open texture, or other suitable material, shall be supplied to those workers liable to inhale dust, and the wearing of such respirators shall be urged where the workers derive benefit from their use.

8. Where di-nitro-benzole has to be handled, the hands shall always be protected from direct contact with it, either by the use of india-rubber gloves (kept perfectly clean, especially in the inner side), or by means of rags which shall be destroyed immediately after use.

9. Where di-nitro-benzole is broken by hand, the instrument used shall be a wooden bar, spade, or tool with a handle long enough to prevent the worker's face from coming into contact with the material.

10. In all rooms or sheds in which the process, either of purifying, grinding, or mixing materials of which di-nitro-benzole forms a part, is carried on, efficient "cowls," ventilating shafts, and mechanical ventilating fans shall be provided to carry off the dust or fumes generated.

11. Drying stoves shall be efficiently ventilated, and, when possible, be charged and drawn at fixed times, and a free current of air shall be admitted for some time prior to the workers entering to draw either a part or the whole of the contents.

12. In the process of filling cartridges, the material shall not be touched by hand, but suitable scoops shall be used, and where patent ventilated cartridge-filling machines are not used, there shall be efficient mechanical ventilation arranged in such a manner that the suction shall draw the fumes or dust away from and not across or over the faces of the workers.

13. A register, in a prescribed form, shall be kept, and it shall be the duty of a responsible person named by the firm to enter, at least once a week, a statement that he has personally satisfied himself that each and all of the special rules have been observed, or if not, the reason for such nonobservance. The surgeon to enter in this register the dates of his visits, the results of such visits, and any requirements made by him.

14. The "dipping" rooms to be efficiently ventilated.

ARTHUR WHITELEGGE,
His Majesty's Chief Inspector of Factories.

NOTE.—These rules must be kept posted up in conspicuous places in the factory to which they apply, where they may be conveniently read by the persons employed. Any person who is bound to observe these rules and fails to do so or acts in contravention of them, is liable to a penalty; and in such case the occupier also is liable to a penalty unless he proves that he has taken all reasonable means by publishing and, to the best of his power, enforcing the rules, to prevent the contravention or noncompliance.

VULCANIZING OF INDIA RUBBER BY MEANS OF BISULPHIDE OF CARBON.

[Form 274—October, 1906.]

I.—DUTIES OF EMPLOYERS.

1. No child or young person shall be employed in any room in which bisulphide of carbon is used.

2. After May 1, 1898, no person shall be employed for more than five hours in any day in a room in which bisulphide of carbon is used, nor for more than two and a half hours at a time without an interval of at least an hour.

3. In vulcanizing waterproof cloth by means of bisulphide of carbon—(*a*) the trough containing the bisulphide of carbon shall be self-feeding and covered over; (*b*) the cloth shall be conveyed to and from the drying chamber by means of an automatic machine; (*c*) no person shall be allowed to enter the drying chamber in the ordinary course of work; (*d*) the machine shall be covered over and the fumes drawn away from the workers by means of a downward-suction fan maintained in constant efficiency.

4. Dipping shall not be done except in boxes so arranged that a suction fan shall draw the fumes away from the workers.

5. No food shall be allowed to be eaten in any room in which bisulphide of carbon is used.

6. A suitable place for meals shall be provided.

7. All persons employed in rooms in which bisulphide of carbon is used shall be examined once a month by the certifying surgeon for the district, who shall, after May 1, 1898, have power to order temporary or total suspension from work.

8. No person shall be employed in any room in which bisulphide of carbon is used contrary to the direction of the certifying surgeon given as above.

9. A register in the form which has been prescribed by the secretary of state for use in india-rubber works shall be kept, and in it the certifying surgeon will enter the dates and result of his visits, with the number of persons examined, and particulars of any directions given by him. This register shall contain a list of all persons employed in rooms in which bisulphide of carbon is used, and shall be produced at any time when required by His Majesty's inspector of factories or by the certifying surgeon.

II.—DUTIES OF PERSONS EMPLOYED.

10. No person shall enter the drying room in the ordinary course of work, or perform dipping except in boxes provided with a suction fan carrying the fumes away from the workers.

11. No person shall take any food in any room in which bisulphide of carbon is used.

12. After May 1, 1898, no person shall, contrary to the direction of the certifying surgeon, given in pursuance of rule 7, work in any room in which bisulphide of carbon is used.

13. All persons employed in rooms in which bisulphide of carbon is used shall present themselves for periodic examination by the certifying surgeon, as provided in rule 7.

14. It shall be the duty of all persons employed to report immediately to the employer or foreman any defect which they may discover in the working of the fan or in any appliance required by these rules.

ARTHUR WHITELEGGE,
His Majesty's Chief Inspector of Factories.

NOTE.—These rules are required to be posted up in conspicuous places in the factory or workshop to which they apply, where they may be conveniently read by the persons employed. Any person who willfully injures or defaces them is liable to a penalty not exceeding £5 ($24.33). Occupiers of factories and workshops, and persons employed therein, who are bound to observe these rules, are liable to penalties in case of noncompliance. (Factory and workshop act, 1891, sec. 9, and factory and workshop act, 1901, secs. 85 and 86.)

LUCIFER-MATCH FACTORIES IN WHICH WHITE OR YELLOW PHOSPHORUS IS USED.

[Form 384—January, 1904.]

In these rules "phosphorous process" means mixing, dipping, drying, boxing, and any other work or process in which white or yellow phosphorus is used; and "person employed in a phosphorous process" means any person who is employed in any room or part of the factory where such a process is carried on.

"Double-dipped matches" means wood splints, both ends of which have been dipped in the igniting composition.

"Certifying surgeon" means a surgeon appointed under the factory and workshop acts.

Any approval or decision given by the chief inspector of factories in pursuance of these rules shall be given in writing, and may at any time be revoked by notice in writing signed by him.

Rules 5 (*a*), 5 (*b*), 6, 8, and 19, so far as they affect the employment of adult workers, shall not come into force until the 1st day of October, 1900.

DUTIES OF EMPLOYERS.

1. No part of a lucifer-match factory shall be constructed, structurally altered, or newly used, for the carrying on of any phosphorous process, unless the plans have previously been submitted in duplicate to the chief inspector of factories, and unless he shall have approved the plans in writing, or shall not within six

weeks from the submission of the plans have expressed his disapproval in writing of the same.

2. Every room in which mixing, dipping, drying, or boxing is carried on shall be efficiently ventilated by means of sufficient openings to the outer air, and also by means of fans, unless the use of fans is dispensed with by order in writing of the chief inspector; shall contain at least 400 cubic feet of air space for each person employed therein; and in computing this air space no height above 14 feet shall be taken into account; shall be efficiently lighted; shall have a smooth and impervious floor. A floor laid with flagstone or hard bricks in good repair shall be deemed to constitute a smooth and impervious floor.

3. (*a*) The processes of mixing, dipping, and drying shall each be done in a separate and distinct room. The process of boxing double-dipped matches or matches not thoroughly dry shall also be done in a separate and distinct room. These rooms shall not communicate with any other part of the factory unless there shall be a ventilated space intervening; nor shall they communicate with one another, except by means of doorways with closely fitting doors, which doors shall be kept shut except when some person is passing through.

(*b*) Mixing shall not be done except in an apparatus, or so arranged and ventilated by means of a fan as to prevent the entrance of fumes into the air of the mixing room.

(*c*) Dipping shall not be done except on a slab provided with an efficient exhaust fan, and with an air inlet between the dipper and the slab, or with a hood so arranged as to draw the fumes away from the dipper and to prevent them from entering the air of the dipping room.

(*d*) Matches that have been dipped and can not at once be removed to the drying room shall immediately be placed under a hood provided with an efficient exhaust fan, so arranged as to prevent the fumes from entering the air of the room.

(*e*) Matches shall not be taken to a boxing room not arranged in compliance with subsection (*f*) of this rule until they are thoroughly dry, and matches shall not be taken to a boxing room that is so arranged until they are dried so far as they can be before cutting down and boxing.

(*f*) Cutting down of double-dipped matches and boxing of matches not thoroughly dry shall not be done except at benches or tables provided with an efficient exhaust fan, so arranged as to draw the fumes away from the worker and prevent them from entering the air of the boxing room.

Provided, that the foregoing rule shall not prevent the employment of any mechanical arrangement for carrying on any of the above-mentioned processes if the same be approved by the chief inspector as obviating the use of hand labor, and if it be used subject to the conditions (if any) specified in such approval.

Provided further, that if the chief inspector shall, on consideration of the special circumstances of any particular case, so approve in writing, all or any of the provisions of the foregoing rule may be suspended for the time named in such approval in writing.

4. Vessels containing phosphorous paste shall, when not actually in use, be kept constantly covered, and closely fitting covers or damp flannels shall be provided for the purpose.

5. (*a*) For the purpose of these rules the occupier shall appoint, subject to the approval of the chief inspector, a duly qualified and registered dentist, herein termed the "appointed dentist."

It shall be the duty of the appointed dentist to suspend from employment in any phosphorous process any person whom he finds to incur danger of phosphorous necrosis by reason of defective conditions of teeth or exposure of the jaw.

(*b*) No person shall be newly employed in a dipping room for more than twenty-eight days, whether such days are consecutive or not, without being examined by the appointed dentist.

(*c*) Every person employed in phosphorous process, except persons employed only as boxers of wax vestas or other thoroughly dry matches, shall be examined by the appointed dentist at least once in every three months.

(*d*) Any person employed in the factory complaining of tootache, or a pain or swelling of the jaw, shall at once be examined by the appointed dentist.

(*e*) When the appointed dentist has reason to believe that any person employed in the factory is suffering from inflammation or necrosis of the jaw, or is in such a state of health as to incur danger of phosphorous necrosis, he shall

at once direct the attention of the certifying surgeon and occupier to the case. Thereupon such person shall at once be examined by the certifying surgeon.

6. No person shall be employed in a phosphorous process after suspension by the appointment dentist, or after the extraction of a tooth, or after any operation involving exposure of the jawbone, or after inflammation or necrosis of the jaw, or after examination by the appointed dentist in pursuance of rule 5 (*d*), or after reference to the certifying surgeon in pursuance of rule 5 (*e*), unless a certificate of fitness has been given, after examination, by signed entry in the health register, by the appointed dentist or by the certifying surgeon in cases referred to him under rule 5 (*e*).

7. A health register, in a form approved by the chief inspector of factories, shall be kept by the occupier, and shall contain a complete list of all persons employed in each phosphorous process, specifying with regard to each such person the full name, address, age when first employed, and date of first employment.

The certifying surgeon will enter in the health register the dates and results of his examinations of persons employed in phosphorous processes, and particulars of any directions given by him.

The appointed dentist will enter in the health register the dates and results of his examinations of the teeth of persons employed in phosphorous processes, and particulars of any directions given by him, and a note of any case referred by him to the certifying surgeon.

The health register shall be produced at any time when required by His Majesty's inspectors of factories, or by the certifying surgeon, or by the appointed dentist.

8. Except persons whose names are on the health register mentioned in rule 7, and in respect of whom certificates of fitness shall have been granted, no person shall be newly employed in any phosphorous process for more than twenty-eight days, whether such days are consecutive or not, without certificate of fitness, granted after examination by the certifying surgeon, by signed entry in the health register.

This rule shall not apply to persons employed only as boxers of wax vestas or other thoroughly dry matches.

9. The occupier shall provide and maintain sufficient and suitable overalls for all persons employed in phosphorous processes, except for persons employed only as boxes of wax vestas or other thoroughly dry matches, and shall cause them to be worn as directed in rule 20.

At the end of every day's work they shall be collected and kept in proper custody in a suitable place set apart for the purpose.

They shall be thoroughly washed every week, and suitable arrangements for this purpose shall be made by the occupier.

10. The occupier shall provide and maintain (*a*) a dining room, and (*b*) a cloakroom in which workers can deposit clothing put off during working hours.

11. No person shall be allowed to prepare or partake of any food or drink in any room in which phosphorous process is carried on, nor to bring any food or drink into such room.

12. The occupier shall provide and maintain for the use of the workers a lavatory, with soap, nailbrushes, towels, and at least one lavatory basin for every five persons employed in any phosphorous process.

Each such basin shall be fitted with waste pipe. There shall be a constant supply of hot and cold water laid onto each basin.

Or, in the place of basins, the occupier shall provide and maintain enamel or galvanized-iron troughs, in good repair, of a total length of 2 feet for every five persons employed, fitted with waste pipes and without plugs, with a sufficient supply of warm water constantly available.

The lavatory shall be kept thoroughly cleansed, and shall be supplied with a sufficient quantity of clean towels twice in each day.

There shall, in addition, be means of washing in close proximity to the workers in any department, if so required in writing by the inspector in charge of the district.

13. The occupier shall provide for the use of every person employed in a phosphorous process an antiseptic mouth wash approved by the appointed dentist, and a sufficient supply of glasses or cups.

14. The floor of each room in which a phosphorous process is carried on shall be cleared of waste at least once a day, and washed at least once a week.

15. A printed copy of these rules shall be given to each person on entering upon employment in a phosphorous process.

DUTIES OF PERSONS EMPLOYED.

16. No person shall work in a mixing, dipping, drying, or boxing room under other conditions than those prescribed in rule 8.

17. No person shall allow a vessel containing phosphorous paste to remain uncovered except when actually in use.

18. All persons employed in a phosphorous process shall present themselves at the appointed times for examination by the certifying surgeon and appointed dentist, as provided in rules 5, 6, and 8.

19. Every person employed in a phosphorous process and suffering from toothache or swelling of the jaw, or having had a tooth extracted or having undergone any other operation involving exposure of the jaw, shall at once inform the occupier, and shall not resume employment in a phosphorous process without a certificate of fitness from the appointed dentist, as provided in rule 6.

No person after suspension by the appointed dentist, or after reference to the certifying surgeon, shall resume empyolment in a phosphorous process without a certificate of fitness, as provided in rule 6.

20. Every person employed in a phosphorous process for whom the occupier is required by rule 9 to provide overalls shall wear while at work the overalls so provided.

21. Every person employed in a phosphorous process shall, before partaking of meals or leaving the premises, deposit the overalls in the place appointed by the occupier for the purpose, and shall thoroughly wash in the lavatory.

22. No person shall prepare or partake of food or drink in any room in which a phosphorous process is carried on, or bring any food or drink into such room.

23. No person shall in any way interfere, without the knowledge and concurrence of the occupier or manager, with the means and appliances provided for the removal of dust and fumes.

24. Foremen and forewomen shall report to the manager any instance coming under their notice of a worker neglecting to observe these rules.

ARTHUR WHITELEGGE,
Chief Inspector of Factories.

APRIL, 1900.

NOTE.—These rules must be kept posted up in conspicuous places in the factory to which they apply, where they may be conveniently read by the person employed. Any person who is bound to observe these rules and fails to do so or acts in contravention of them is liable to a penalty; and in such cases the occupier also is liable to a penalty unless he proves that he has taken all reasonable means by publishing and, to the best of his power, enforcing the rules to prevent the contravention or noncompliance.

FELT HATS.

Whereas the manufacturer of felt hats with the aid of inflammable solvent has been certified in pursuance of section 79 of the factory and workshop act, 1901, to be dangerous, I hereby, in pursuance of the power conferred on me by that act, make the following regulations, and direct that they shall apply to all factories and workshops in which any inflammable solvent is used in the manufacture of felt hats:

1. Every proofing room and every stove or drying room in which an inflammable solvent is evaporated shall be thoroughly ventilated to the satisfaction of the inspector for the district, so as to carry off as far as possible the inflammable vapor.

2. The number of wet spirit-proofed hat bodies allowed to be in a proofing room at any one time shall not exceed the proportion of one hat for each 15 cubic feet of air space; and in no stove, while the first drying of any spirit-proofed hats is being carried on, shall the number of hat bodies of any kind exceed a proportion of one hat for each 12 cubic feet of air space.

A notice stating the dimensions of each such room or stove in cubic feet and the number of spirit-proofed hats allowed to be therein at any one time shall be kept constantly affixed in a conspicuous position.

3. Spirit-proofed hats shall be opened out singly and exposed for one hour before being placed in the stove. This requirement shall not apply in the case of a stove which contains no fire or artificial light capable of igniting inflammable vapor, and which is so constructed and arranged as, in the opinion of the inspector for the district, to present no risk of such ignition from external fire or light.

4. The above rules, in so far as they affect drying stoves, shall not apply to the process of drying hat bodies where the solvent is recovered in a closed oven or chamber fitted with safe and suitable apparatus for the condensation of the solvent.

5. No person shall smoke in any room or place in which inflammable solvent is exposed to the air.

These regulations shall come into force on the 1st day of October, 1902.

A. AKERS-DOUGLAS,
One of His Majesty's Principal Secretaries of State.

WHITEHALL, *August 12, 1902.*

SPECIAL RULES FOR THE HANDLING OF DRY AND DRYSALTED HIDES AND SKINS IMPORTED FROM CHINA OR FROM THE WEST COAST OF INDIA.

[Form 486—February, 1906.]

DUTIES OF OCCUPIERS.

1. Proper provision to the reasonable satisfaction of the inspector in charge of the district shall be made for the keeping of the workmen's food and clothing outside any room or shed in which any of the above-described hides or skins are unpacked, sorted, packed, or stored.

2. Proper and sufficient appliances for washing, comprising soap, basins, with water laid on nailbrushes, and towels shall be provided and maintained for the use of the workmen, to the reasonable satisfaction of the inspector in charge of the district.

3. Sticking plaster and other requisites for treating scratches and slight wounds shall be kept at hand, available for the use of the persons employed.

4. A copy of the appended notes shall be kept affixed with the rules.

DUTIES OF PERSONS EMPLOYED.

5. No workman shall keep any food, or any article of clothing other than those he is wearing, in any room or shed in which any of the above-described hides or skins are handled.

He shall not take any food in any such room or shed.

6. Every workman having any open cut or scratch or raw surface, however trifling, upon his face, head, neck, arm, or hand shall immediately report the fact to the foreman, and shall not work on the premises until the wound is healed or is completely covered by a proper dressing after being thoroughly washed.

ARTHUR WHITELEGGE,
Chief Inspector of Factories.
CHAS. T. RITCHIE,
One of His Majesty's Principal Secretaries of State.

AUGUST, 1901.

NOTE 1.—These rules must be kept posted up in conspicuous places in the factory to which they apply, where they may be conveniently read by the persons employed. Any person who is bound to observe these rules and fails to do so, or acts in contravention of them, is liable to a penalty; and in such cases the occupier also is liable to a penalty unless he proves that he has taken all reasonable means by publishing and, to the best of his power, enforcing the rules to prevent the contravention or noncompliance.

NOTE 2.—The danger against which these rules are directed is that of anthrax—a fatal disease affecting certain animals, which may be conveyed from them to man by the handling of hides of animals which have died of the disease. The germs of the disease (anthrax sores) are found in the dust and in the substance of the hide, and may remain active for years. In this country anthrax is rare, and precautions are taken to prevent infected hides from coming into the market, consequently there is little danger in handling the hides of animals slaughtered in the United Kingdom; but in Russia, China, and the East Indies and in many other parts of the world the disease is common, and infected hides (which do not differ from others in appearance) are often shipped to British ports. Hence, in handling foreign dry hides the above rules should be carefully observed. Wet salted hides are free from dust and less risk is incurred in handling them.

The disease is communicated to man sometimes by breathing or swallowing the dust from an infected hide, but much more usually by the poison lodging in some point where the skin is broken—such as a fresh scratch or cut or a scratched pimple, or even chapped hands. This happens most readily on the uncovered parts of the body, the hand, arm, face, and most frequently of all on the neck—owing either to an infected hide rubbing against the bare skin, or to dust from such hide alighting on the raw surface. But a raw surface covered by clothing is not free from risk, for dust lodging upon the clothes may sooner or later work its way to the skin beneath. Infection may also be brought about by rubbing or scratching a pimple with hand or nail carrying the anthrax poison.

The first symptoms of anthrax is usually a small inflamed swelling like a pimple or boil, often quite painless, which extends and in a few days becomes black at the center and surrounded by other "pimples." The poison is now liable to be absorbed into the system and will cause risk of life, which can be avoided only by prompt and effective medical treatment in the early stage while the poison is still confined to the pimple. Hence it is of the utmost importance that a doctor should at once be consulted if there is any suspicion of infection.

NOTE.—Suitable overalls, protecting the neck and arms, as well as ordinary clothing, add materially to the safety of the workmen, and should be provided and worn, where practicable, if dangerous hides are handled. They should be discarded on cessation of work. Similarly, for the protection of the hands, gloves should be provided and worn where the character of the work permits.

WOOL AND HAIR SORTING.

Whereas, the processes of sorting, willying, washing, and combing and carding wool, goat hair, and camel hair and processes incidental thereto have been certified, in pursuance of section 79 of the factory and workshop act, 1901, to be dangerous:

I hereby, in pursuance of the powers conferred on me by that act, make the following regulations, and direct that they shall apply to all factories and workshops in which the said processes are carried on and in which the materials named in the schedules are used.

It shall be the duty of the occupier to comply with regulations 1 to 16. It shall be the duty of all persons employed to comply with regulations 17 to 28.

These regulations shall come into force on the 1st of January, 1906, except that regulations 2 and 8 shall not come into force until the 1st of April, 1906.

DEFINITION.

For the purpose of regulations 2, 8, and 18, opening of wool or hair means the opening of the fleece, including the untying or cutting of the knots, or, if the material is not in fleece, the opening out for looking over or classing purposes.

DUTIES OF OCCUPIERS.

1. No bale of wool or hair of the kinds named in the schedules shall be opened for the purpose of being sorted or manufactured, except by men skilled in judging the condition of the material.

No bale of wool or hair of the kinds named in Schedule A shall be opened except after thorough steeping in water.

2. No wool or hair of the kinds named in Schedule B shall be opened except (*a*) after steeping in water, or (*b*) over an efficient opening screen, with mechanical exhaust draft, in a room set apart for the purpose, in which no other work than opening is carried on.

For the purpose of this regulation, no opening screen shall be deemed to be efficient unless it complies with the following conditions:

(*a*) The area of the screen shall in the case of existing screens be not less than 11 square feet, and in the case of screens hereafter erected be not less than 12 square feet, nor shall its length or breadth be less than 3½ feet.

(*b*) At no point of the screen within 18 inches from the center shall the velocity of the exhaust draft be less than 100 linear feet per minute.

3. All damaged wool or hair or fallen fleeces or skin wool or hair, if of the kinds named in the schedules, shall when opened be damped with a disinfectant and washed without being willowed.

4. No wool or hair of the kinds named in schedules B or C shall be sorted except over an efficient sorting board, with mechanical exhaust draft, and in a room set apart for the purpose, in which no work is carried on other than sorting and the packing of the wool or hair therein.

No wool or hair of the kinds numbered (1) and (2) in Schedule A shall be sorted except in the damp state and after being washed.

No damaged wool or hair of the kinds named in schedules shall be sorted except after being washed.

For the purpose of this regulation, no sorting board shall be deemed to be efficient unless it complies with the following conditions:

The sorting board shall comprise a screen of open wirework, and beneath it at all parts a clear space not less than 3 inches in depth. Below the center of the screen there shall be a funnel, measuring not less than 10 inches across the top, leading to an extraction shaft, and the arrangements shall be such that all dust falling through the screen and not carried away by the exhaust can be swept directly into the funnel. The draft shall be maintained in constant efficiency whilst the sorters are at work, and shall be such that not less than 75 cubic feet of air per minute are drawn by the fan from beneath each sorting board.

5. No wool or hair of the kinds named in the schedules shall be willowed except in an efficient willowing machine, in a room set apart for the purpose, in which no work other than willowing is carried on.

For the purpose of this regulation no willowing machine shall be deemed to be efficient unless it is provided with mechanical exhaust draft so arranged as to draw the dust away from the workmen and prevent it from entering the air of the room.

6. No bale of wool or hair shall be stored in a sorting room; nor any wool or hair except in a space effectually screened off from the sorting room.

No wool or hair shall be stored in a willowing room.

7. In each sorting room, and exclusive of any portion screened off, there shall be allowed an air space of at least 1,000 cubic feet for each person employed therein.

8. In each room in which sorting, willowing, or combing is carried on suitable inlets from the open air, or other suitable source, shall be provided and arranged in such a way that no person employed shall be exposed to a direct draft from any air inlet or to any draft at a temperature of less than 50° F.

The temperature of the room shall not during working hours fall below 50° F.

9. All bags in which wool or hair of the kinds named in the schedules has been imported shall be picked clean and not brushed.

10. All pieces of skin, scab, and clippings or shearings shall be removed daily from the sorting room, and shall be disinfected or destroyed.

11. The dust carried by the exhaust draft from opening screens, sorting boards, willowing or other dust-extracting machines and shafts shall be discharged into properly constructed receptacles and not into the open air.

Each extracting shaft and the space beneath the sorting boards and opening screens shall be cleaned out at least once in every week.

The dust collected as above, together with the sweepings from the opening, sorting, and willowing rooms, shall be removed at least twice a week and burned.

The occupier shall provide and maintain suitable overalls and respirators to be worn by the persons engaged in collecting and removing the dust.

Such overalls shall not be taken out of the works or warehouse, either for washing, repairs, or any other purpose, unless they have been steeped overnight in boiling water or a disinfectant.

12. The floor of every room in which opening, sorting, or willowing is carried on shall be thoroughly sprinkled daily with a disinfectant solution after work has ceased for the day, and shall be swept immediately after sprinkling.

13. The walls and ceilings of every room in which opening, sorting, or willowing is carried on shall be limewashed at least once a year, and cleansed at least once within every six months, to date from the time when they were last cleansed.

14. The following requirements shall apply to every room in which unwashed wool or hair of the kinds named in the schedules, after being opened for sorting, manufacturing, or washing purposes, is handled or stored.

(a) Sufficient and suitable washing accommodation shall be provided outside the rooms and maintained for the use of all persons employed in such rooms.

The washing conveniences shall comprise soap, nailbrushes, towels, and at least one basin for every five persons employed as above, each basin being fitted with a waste pipe and having a constant supply of water laid on.

(*b*) Suitable places shall be provided outside the rooms in which persons employed in such rooms can deposit food and clothing put off during working hours.

(*c*) No person shall be allowed to prepare or partake of food in any such room.

Suitable and sufficient meal room accommodation shall be provided for workers employed in such rooms.

(*d*) No person having any open cut or sore shall be employed in any such room.

The requirements in paragraph (*c*) shall apply also to every room in which any wool or hair of the kinds named in the schedules is carded or stored.

15. Requisites for treating scratches and slight wounds shall be kept at hand.

16. The occupier shall allow any H. M. inspectors of factories to take at any time, for the purpose of examination, sufficient samples of any wool or hair used on the premises.

DUTIES OF PERSONS EMPLOYED.

17. No bale of wool or hair of the kinds named in the schedules shall be opened otherwise than as permitted by paragraph 1 or regulation 1, and no bale of wool or hair of the kinds named in Schedule A shall be opened except after thorough steeping in water.

If on opening a bale any damaged wool or hair of the kinds named in the schedules is discovered, the person opening the bale shall immediately report the discovery to the foreman.

18. No wool or hair of the kinds named in Schedule B shall be opened otherwise than as permitted by regulation 2.

19. No wool or hair of the kinds named in the schedules shall be sorted otherwise than as permitted by regulation 4.

20. No wool or hair of the kinds named in the schedules shall be willowed except as permitted by regulation 5.

21. Every person employed in a room in which unwashed wool or hair of the kinds named in the schedules is stored or handled shall observe the following requirements:

(*a*) He shall wash his hands before partaking of food, or leaving the premises.

(*b*) He shall not deposit in any such room any article of clothing put off during working hours.

He shall wear suitable overalls while at work, and shall remove them before partaking of food or leaving the premises.

(*c*) If he has any open cut or sore, he shall report the fact at once to the foreman, and shall not work in such a room.

No person employed in any such room or in any room in which wool or hair of the kinds named in the schedule is either carded or stored shall prepare or partake of any food therein, or bring any food therein.

22. Persons engaged in collecting or removing dust shall wear the overalls as required by regulation 11.

Such overalls shall not be taken out of the works or warehouse either for washing, repairs, or any other purpose, unless they have been steeped overnight in boiling water or a disinfectant.

23. If any fan, or any other appliance for the carrying out of these regulations, is out of order, any workman becoming aware of the defect shall immediately report the fact to the foreman.

H. J. GLADSTONE,
One of Her Majesty's Principal Secretaries of State.

HOME OFFICE, *Whitehall, 12th December, 1903.*

Schedule A.

(Wool or hair required to be opened either after steeping or over an efficient opening screen.)

1. Van mohair.
2. Persian locks.
3. Persian or so-called Persian (including Karadi and Bagdad) if not subjected to the process of sorting or willowing.

Schedule B.

(Wool or hair required to be opened either after steeping or over an efficient opening screen.)

Alpaca.
Pelitan.
East Indian cashmere.
Russian camel hair.
Pekin camel hair.
Persian or so-called Persian (including Karadi and Bagdad) if subjected to the process of sorting or willowing.

Schedule C.

(Wool or hair not needing to be opened over an opening screen, but required to be sorted over a board provided with downward draft.)

All mohair other than van mohair.

NOTE.—The danger against which these regulations are directed is that of anthrax—a fatal disease affecting certain animals, which my be conveyed from them to man by the handling of wools or hairs from animals which have died of the disease. The germs of the disease (anthrax spores) are found in the dust attaching to the wool, or in the excrement, and in the substance of the pieces of skin, and may remain active for years. In this country and Australia anthrax is rare, consequently there is little danger in handling wools from the sheep of these two countries, but in China, Persia, Turkey, Russia, the East Indies, and in many other parts of the world, the disease is common, and infected fleeces or locks (which may not differ from others in appearance) are often shipped to Great Britain. Hence, in handling foreign dry wools and hair, the above regulations should be carefully observed. Greasy wools are comparatively free from dust and therefore little risk is incurred in handling them. The disease is communicated to man sometimes by breathing or swallowing the dust from these wools or hair, and sometimes by the poison lodging in some point where the skin is broken, such as a fresh scratch or cut, or a scratched pimple, or even chapped hands. This happens more readily on the uncovered parts of the body, the hand, arm, face, and most frequently of all, on the neck, owing either to infected wool rubbing against the bare skin, or to dust from such wool alighting on the raw surface. But a raw surface covered by clothing is not free from risk, for the dust lodging upon the clothes may sooner or later work its way to the skin beneath. Infection may also be brought about by rubbing or scratching a pimple with hand or nail carrying the anthrax poison. Use of the nailbrush, and frequent washing and bathing of the whole body, especially of the arms, neck, and head, will lessen the chance of contracting anthrax.

The first symptom of anthrax is usually a small inflamed swelling like a pimple or boil—often quite painless—which extends, and in a few days becomes black at the center, and surrounded by other "pimples." The poison is now liable to be absorbed into the system, and will cause risk of life, which can be avoided only by prompt and effective medical treatment in the early stage, while the poison is still confined to the pimple. Hence, it is of the utmost importance that a doctor should be *at once* consulted if there is any suspicion of infection.

FLAX AND TOW SPINNING AND WEAVING.

Whereas the processes of spinning and weaving flax and tow and the processes incidental thereto have been certified in pursuance of section 70 of the factory and workshop act, 1901, to be dangerous:

I hereby, in pursuance of the powers conferred on me by that act, make the following regulations, and direct that they shall apply to all factories in which the processes named above are carried on, and to all workshops in which the processes of roughing, sorting, and hand-hackling of flax or tow are carried on.

These regulations shall come into force on the 1st day of February, 1907.

Provided that in case of all rooms in which roughing or hand-hackling is now carried on, and in which there is respectively (*a*) no system of local mechanical exhaust ventilation, or (*b*) no artificial means of regulating the temperature, Regulations 2 and 3, respectively, shall not come into force until the 1st day of February, 1908.

DEFINITIONS.

In these regulations—

"Degrees" means degrees on the Fahrenheit scale.

"Roughing, sorting, hand-hackling, machine-hackling, carding, and preparing" mean those processes in the manufacture of flax or tow.

It shall be the duty of the occupier to observe Part I of these regulations.

It shall be the duty of all persons employed to observe Part II of these regulations.

PART I.—DUTIES OF OCCUPIERS.

1. In every room in which persons are employed the arrangements shall be such that during working hours the proportion of carbonic acid in the air of the room shall not exceed 20 volumes per 10,000 volumes of air at any time when gas or oil is used for lighting (or within one hour thereafter) or 12 volumes per 10,000 when electric light is used (or within one hour thereafter) or 9 volumes per 10,000 at any other time.

Provided that it shall be a sufficient compliance with this regulation if the proportion of carbonic acid in the air of the room does not exceed that of the open air outside by more than 5 volumes per 10,000 volumes of air.

2. In every room in which roughing, sorting, or hand-hackling is carried on, and in every room in which machine-hackling, carding, or preparing is carried on, and in which dust is generated and inhaled to an extent likely to cause injury to the health of the workers, efficient exhaust and inlet ventilation shall be provided to secure that the dust is drawn away from the workers at, or as near as reasonably possible to, the point at which it is generated.

For the purposes of this regulation the exhaust ventilation in the case of hand-hackling, roughing, or sorting shall not be deemed to be efficient if the exhaust opening at the back of the hackling pins measures less than 4 inches across in any direction, or has a sectional area of less than 50 square inches, or if the linear velocity of the draft passing through it is less than 400 feet per minute at any point within a sectional area of 50 square inches.

3. In every room in which hand-hackling, roughing, sorting, machine-hackling, carding, or preparing is carried on, an accurate thermometer shall be kept affixed; and the arrangements shall be such that the temperature of the room shall not at any time during working hours where hand-hackling, roughing, or machine-hackling is carried on fall below 50°, or where sorting, carding, or preparing is carried on below 55°; and that no person employed shall be exposed to a direct draft from any air inlet, or to any draft at a temperament of less than 50°.

Provided that it shall be a sufficient compliance with this regulation if the heating apparatus be put into operation at the commencement of work, and if the required temperature be maintained after the expiration of one hour from the commencement of work.

4. In every room in which wet spinning is carried on, or in which artificial humidity of air is produced in aid of manufacture, a set of standardized wet and dry bulb thermometers shall be kept affixed in the center of the room or in such other position as may be directed by the inspector of the district by notice in writing, and shall be maintained in correct working order.

Each of the above thermometers shall be read between 10 and 11 a. m. on every day that any person is employed in the room, and again between 3 and 4 p. m. on every day that any person is employed in the room after 1 p. m., and each reading shall be at once entered on the prescribed form.

The form shall be hung up near the thermometers to which it relates, and shall be forwarded, duly filled in, at the end of each calendar month to the inspector of the district. Provided, that this part of this regulation shall not apply to any room in which the difference of reading between the wet and dry bulb thermometers is never less than 4°, if notice of intention to work on that system has been given in the prescribed form to the inspectors for the district, and a copy of the notice is kept affixed in the room to which it applies.

5. The humidity of the atmosphere of any room to which regulation 4 applies shall not at any time be such that the difference between the readings of the wet and dry bulb thermometers is less than 2°.

6. No water shall be used for producing humidity of the air, or in wet-spinning troughs, which is liable to cause injury to the health of the persons employed or to yield effluvia; and for the purpose of this regulation any water

which absorbs from acid solution of permanganate of potash in four hours at 60° more than 0.5 grains of oxygen per gallon of water shall be deemed to be liable to cause injury to the health of the persons employed.

7. Efficient means shall be adopted to prevent the escape of steam from wet-spinning troughs.

8. The pipes used for the introduction of steam into any room in which the temperature exceeds 70°, or for heating the water in any wet-spinning trough, shall so far as they are within the room and not covered by water be as small in diameter and as limited in length as is reasonably practicable, and shall be effectively covered with nonconducting material.

9. Efficient splash guards shall be provided and maintained on all wet-spinning frames of 2¾-inch pitch and over, and on all other wet-spinning frames unless waterproof skirts and bibs of suitable material are provided by the occupier and worn by the workers.

Provided, that if the chief inspector is satisfied with regard to premises in use prior to 30th June, 1905, that the structural conditions are such that splash guards can not conveniently be used, he may suspend the requirements as to splash guards. Such suspension shall only be allowed by certificate in writing, signed by the chief inspector, and shall be subject to such conditions as may be stated in the certificate.

10. The floor of every wet-spinning room shall be kept in sound condition, and drained so as to prevent retention or accumulation of water.

11. There shall be provided for all persons employed in any room in which wet spinning is carried on, or in which artificial humidity of air is produced in air of manufacture, suitable and convenient accommodaton in which to keep the clothing taken off before starting work, and in the case of building erected after 30th June, 1905, in which the difference between the readings of the wet and dry bulb thermometers is at any time less than 4°, such accommodation shall be provided in cloak rooms, ventilated, and kept at a suitable temperature and situated in or near the workrooms in question.

12. Suitable and efficient respirators shall be provided for the use of the persons employed in machine-hackling, preparing, and carding.

PART II.—DUTIES OF PERSONS EMPLOYED.

13. All persons employed on wet-spinning frames without efficient splash guards shall wear the skirts and bibs provided by the occupier in pursuance of regulation 9.

14. No person shall in any way interfere, without the concurrence of the occupier or manager, with the means and appliances provided for ventilation, or for the removal of dust, or for the other purposes of these regulations.

H. J. GLADSTONE,
One of His Majesty's Principal Secretaries of State.

HOME OFFICE, *Whitehall, 20th February, 1906.*

FILE CUTTING BY HAND.

Whereas the process of file cutting by hand has been certified in pursuance of section 79 of the factory and workshop act, 1901, to be dangerous:

I hereby, in pursuance of the powers conferred on me by that act, make the following regulations, and direct that they shall apply to all factories and workshops (including tenement factories and tenement workshops) or parts thereof in which the process of file cutting by hand is carried on; provided that the chief inspector of factories may by certificate in writing exempt from all or any of these regulations any factory or workshop in which he is satisfied that the beds used are of such composition as not to entail danger to the health of the persons employed.

1. The number of stocks in any room shall not be more than one stock for every 350 cubic feet of air space in the room; and in calculating air space for the purpose of this regulation any space more than 10 feet above the floor of the room shall not be reckoned.

2. After the 1st day of January, 1904, the distance between the stocks measured from the center of one stock to the center of the next shall not be less than 2 feet 6 inches, and after the 1st day of January, 1905, the said distance shall not be less than 3 feet.

3. Every room shall have a substantial floor, the whole of which shall be covered with a washable material, save that it shall be optional to leave a space not exceeding 6 inches in width round the base of each stock.

The floor of every room shall be kept in good repair.

4. Efficient inlet and outlet ventilators shall be provided in every room. The inlet ventilators shall be so arranged and placed as not to cause a direct draft of incoming air to fall on the workmen employed at the stocks.

The ventilators shall be kept in good repair and in working order.

5. No person shall interfere with or impede the working of the ventilators.

6. Sufficient and suitable washing conveniences shall be provided and maintained for the use of the file cutters. The washing conveniences shall be under cover and shall comprise at least one fixed basin for every ten or less stocks. Every basin shall be fitted with a waste pipe discharging over a drain or into some receptacle of a capacity at least equal to 1 gallon for every file cutter using the basin. Water shall be laid onto every basin either from the main or from a tank of a capacity of not less than 1½ gallons to every worker supplied from such tank. A supply of clean water shall be kept in the said tank while work is going on at least sufficient to enable every worker supplied from such tank to wash.

7. The walls and ceiling of every room, except such parts as are painted or varnished or made of glazed brick, shall be limewashed once in every six months ending the 30th of June and once in every six months ending the 31st of December.

8. The floor and such parts of the walls and ceiling as are not limewashed and the benches shall be cleansed once a week.

9. If the factory or workshop is situated in a dwelling house the work of file cutting shall not be carried on in any room which is used as a sleeping place or for cooking or eating meals.

10. Every file cutter shall when at work wear a long apron reaching from the shoulders and neck to below the knees. The apron shall be kept in a cleanly state.

11. A copy of these regulations and an abstract of the provisions of the factory and workshop act, 1901, shall be kept affixed in the factory or workshop in a conspicuous place.

12. It shall be the duty of the occupier to carry out regulations 1, 2, 3, 4, 6, 7, and 11; except that, in any room in a tenement factory or tenement workshop which is let to more than one occupier, it shall be the duty of the owner to carry out these regulations, except the last clause of regulation 6, which shall be carried out by the occupiers.

It shall be the duty of the occupier or occupiers to carry out regulation 8.

It shall be the duty of the occupier or occupiers and of every workman to observe regulations 5, 9, and 10.

These regulations shall come into force on the 1st day of September, 1903.

A. AKERS-DOUGLAS,
One of His Majesty's Principal Secretaries of State.

HOME OFFICE, *Whitehall, 19th June, 1903.*

SPECIAL RULES FOR THE BOTTLING OF AERATED WATER.

[Form 273—A 1-3-01.]

DUTIES OF OCCUPIERS.

1. They shall provide all bottlers with face guards, masks, or veils of wire gauze.

They shall provide all wirers, sighters, and labelers with face guards, masks, or veils of wire gauze, or goggles.

2. They shall provide all bottlers with full-length gauntlets for both arms.

They shall provide all wirers, sighters, and labelers with gauntlets for both arms, protecting at least half of the palm and the space between the thumb and forefinger.

3. They shall cause all machines for bottling to be constructed, so placed, or so fenced, as to prevent as far as possible, during the operation of filling or corking, a fragment of a bursting bottle from striking any bottler, wirer, sighter, labeler, or washer.

DUTIES OF PERSONS EMPLOYED.

4. All bottlers shall, while at work, wear face guards, masks, or veils of wire gauze.

All wirers, sighters, and labelers shall, while at work, wear on both arms gauntlets protecting at least half of the palm and the space between the thumb and forefinger; except labelers when labeling bottles standing in cases.

ARTHUR WHITELEGGE,
His Majesty's Inspector of Factories.

AUGUST, 1897.

These rules are required to be posted up in conspicuous places in the factory or workshop to which they apply, where they may be conveniently read by the persons employed therein, who are bound to observe any special rules, are liable to a penalty of £5 ($24.33). Occupiers of factories and workshops and persons employed therein who are bound to observe any special rules are liable to penalties for noncompliance (factory and workshop act, 1891, sections 9 and 11).

The employer is required to provide the articles mentioned in the rules, and to take all reasonable precautions to the best of his power to enforce their use, but the responsibility for the actual wearing of them rests with the person employed.

SPINNING BY SELF-ACTING MULES.

Whereas certain machinery used in the process of spinning in textile factories, and known as self-acting mules, has been certified in pursuance of section 79 of the factory and workshop act, 1901, to be dangerous to life and limb:

I hereby, in pursuance of the powers conferred on me by that act, make the following regulations, and direct that they shall apply to all factories or parts thereof in which the process of spinning by means of self-acting mules is carried on:

1. In these regulations the term "minder" means the person in charge of a self-acting mule for the time being.

2. Save as hereinafter provided, it shall be the duty of the occupier of a factory to observe Part I of these regulations; provided that it shall be the duty of the owner (whether or not he is one of the occupiers) of a tenement factory to observe Part I of these regulations, except so far as relates to such parts of the machinery as are supplied by the occupier.

It shall be the duty of the persons employed to observe Part II of these regulations, but it shall be the duty of the occupier, for the purpose of enforcing their observance, to keep a copy of the regulations in legible characters affixed in every mule room, in a conspicuous position, where they may be conveniently read.

PART I.—DUTIES OF OCCUPIERS.

3. After January 1, 1906, the following parts of every self-acting mule shall be securely fenced as far as reasonably practicable, unless it can be shown that by their position or construction they are equally safe to every person employed as they would be if securely fenced:

(*a*) Back shaft scrolls and carrier pulleys and draw band pulleys.
(*b*) Front and back carriage wheels.
(*c*) Faller-stops.
(*d*) Quadrant pinions.
(*e*) Back of headstocks, including rim pulleys and taking-in scrolls.
(*f*) Rim band tightening pulleys, other than plate wheels, connected with a self-acting mule erected after January 1, 1906.

PART II.—DUTIES OF PERSONS EMPLOYED.

4. It shall be the duty of the minder of every self-acting mule to take all reasonable care to insure:

(*a*) That no child cleans any part or under any part thereof whilst the mule is in motion by the aid of mechanical power.

(*b*) That no woman, young person, or child work between the fixed and traversing parts thereof whilst the mule is in motion by the aid of mechanical power.

(*c*) That no person is in the space between the fixed and traversing parts thereof unless the mule is stopped on the outward run.

5. No self-acting mule shall be started or restarted except by the minder or at his express orders, nor until he has ascertained that no person is in the space betweeen the fixed and traversing parts thereof.

A. AKERS-DOUGLAS,
One of His Majesty's Principal Secretaries of State.

HOME OFFICE, *Whitehall, 17th October, 1905.*

LOADING GOODS ON DOCKS AND WHARVES.

Whereas the processes of loading, unloading, moving, and handling goods in, on, or at any dock, wharf, or quay, and the processes of loading, unloading, and coaling any ship in any dock, harbor, or canal have been certified in pursuance of section 79 of the factory and workshop act, 1901, to be dangerous:

I hereby, in pursuance of the powers conferred on me by that act make the following regulations for the protection of persons employed in the processes or in any of them, and direct that they shall apply to all docks, wharves, quays, and ships as aforesaid.

These regulations shall come into force on the 1st of January, 1906, except that so much of regulations 6 and 8 as require structural alterations shall come into force on the 1st of January, 1908.

Nothing in Parts II to VI, inclusive, of these regulations shall apply to the unloading of fish from a vessel employed in the catching of fish.

The secretary of state may by order in writing exempt from all or any of the regulations and for such time and subject to such conditions as he may prescribe any docks, wharves, or quays in respect of which application for such exemption shall have been made to him by the department of agriculture and technical instruction for Ireland or by the congested districts board for Ireland.

DEFINITIONS.

"Processes" means the processes above mentioned, or any of them.

"Persons employed" means a person employed in the above processes, or any of them.

"Shallow canal" includes any of the following parts of a canal, canalized river, nontidal river, or inland navigation:

(*a*) Any part having no means of access to tidal waters except through a lock not exceeding 90 feet in length; (*b*) any part not in frequent use for the processes; and (*c*) any part at which the depth of water within 15 feet of the edge does not ordinarily exceed 5 feet.

DUTIES.

It shall be the duty of the person having the general management and control of a dock, wharf, or quay to comply with Part I of these regulations; provided that if any other person has the exclusive right to occupation of any part of the dock, wharf, or quay, and has the general management and control of such part the duty in respect of that part shall devolve upon that other person; and further provided that this part of these regulations shall not apply to any shallow canal.

It shall be the duty of the owner or officer in charge of a ship to comply with Part II of these regulations.

It shall be the duty of the owner of machinery or plant used in the processes, and in the case of machinery or plant carried on board a ship not being a ship registered in the United Kingdom it shall also be the duty of the master of such ship, to comply with Part III of these regulations.

It shall be the duty of every person who by himself, his agents, or workmen carries on the processes, and of all agents, workmen, and persons employed by him in the processes, to comply with Part IV of these regulations.

It shall be the duty of all persons, whether owners, occupiers, or persons employed, to comply with Part V of these regulations.

Part VI of these regulations shall be complied with by the persons on whom the duty is placed in that part.

PART I.

1. The following parts of every dock, wharf, or quay, as far as is practicable, having regard to the traffic and working, be securely fenced so that the height of the fence shall be in no place less than 2 feet 6 inches, and the fencing shall be maintained in good condition ready for use.

(*a*) All breaks, dangerous corners, and other dangerous parts of edges of a dock, wharf, or quay.

(*b*) Both sides of such footways over bridges, caissons, and dock gates as are in general use by persons employed, and each side of the entrance at each end of such footway for a sufficient distance not exceeding 5 yards.

2. Provision for the rescue from drowning of persons employed shall be made and maintained, and shall include:

(*a*) A supply of life-saving appliances, kept in readiness on the wharf or quay, which shall be reasonably adequate, having regard to all the circumstances.

3. All places in which persons employed are employed at night, and any dangerous parts of the regular road or way over a dock, wharf, or quay, forming the approach to any such place from the nearest highway, shall be efficiently lighted.

Provided that the towing path of a canal or canalized river shall not be deemed to be "an approach" for the purpose of this regulation.

PART II.

4. If a ship is lying at a wharf or quay for the purpose of loading or unloading or coaling there shall be means of access for the use of persons employed at such times as they have to pass from the ship to the shore or from the shore to the ship, as follows:

(*a*) Where a gangway is reasonably practicable a gangway not less than 22 inches wide, properly secured, and fenced throughout on each side to a clear height of 2 feet 9 inches by means of upper and lower rails, taut ropes, or chains, or by other equally safe means.

(*b*) In other cases a secure ladder of adequate length.

Provided that nothing in this regulation shall be held to apply to cargo stages or cargo gangways, if other proper means of access is provided in conformity with these regulations.

Provided that as regards any sailing vessel not exceeding 250 tons net registered tonnage and any steam vessel not exceeding 150 tons gross registered tonnage this regulation shall not apply if and while the conditions are such that it is possible, without undue risk, to pass to and from the ship without the aid of any special appliances.

5. If a ship is alongside any other ship, vessel, or boat, and persons employed have to pass from one to the other, safe means of access shall be provided for their use, unless the conditions are such that it is impossible to pass from one to the other without undue risk without the aid of any special appliance.

If one of such ships, vessels, or boats is a sailing barge, flat, keel, lighter, or other similar vessel of relatively low freeboard, the means of access shall be provided by the ship which has the higher freeboard.

6. If the depth from the top of the coamings to the bottom of the hold exceeds 6 feet, there shall be maintained safe means of access by ladder or steps from the deck to the hold in which work is being carried on, with secure handhold and foothold continued to the top of the coamings.

In particular such access shall not be deemed to be safe:

(*a*) Unless the ladders between the lower decks are in the same line as the ladder from the main deck, if the same is practicable having regard to the position of the lower hatchway or hatchways.

(*b*) Unless the cargo is stowed sufficiently far from the ladder to leave at each rung of the ladder sufficient room for a man's feet.

(*c*) If there is not room to pass between a winch and the coamings at the place where the ladder leaves the deck.

(*d*) If the ladder is recessed under the deck more than is reasonably necessary to keep the ladder clear of the hatchway.

7. When the processes are being carried on between one hour after sunset and one hour before sunrise, (*a*) the places in the hold and on the decks where work is being carried on and (*b*) the means of access provided in pursuance of regulations 4 and 5 shall be efficiently lighted, due regard being had to the

safety of the ship and cargo, of all persons employed, and of the navigation of other vessels, and to the duly approved by-laws or regulations of any authority having power by statute to make by-laws or regulations subject to approval by some other authority.

8. All iron fore-and-aft beams and thwart-ship beams used for hatchway covering shall have suitable gear for lifting them on and off without it being necessary for any person to go upon them to adjust such gear.

PART III.

9. All machinery and chains and other gear used in hoisting or lowering in connection with the processes shall have been tested, and shall be periodically examined. All such chains shall be effectually softened by annealing or firing when necessary, and all half-inch or smaller chains in general use shall be so annealed or fired once in every six months.

If the chains are part of the outfit carried by a seagoing ship, it shall be a sufficient compliance with this regulation as regards softening by annealing or firing of half-inch or smaller chains that no such chains shall be used unless they have been so annealed or fired within six months preceding.

As regards chains, the safe loads indicated by the test, the date of last annealing, and any other particulars prescribed by the secretary of state, shall be entered in a register which shall be kept on the premises, unless some other place has been approved in writing by the chief inspector.

10. All motors, cogwheels, chains and friction gearing, shafting, and live electric conductors used in the processes shall (unless it can be shown that by their position and construction they are equally safe to every person employed as they would be if securely fenced) be securely fenced so far as is practicable without impeding the safe working of the ship without infringing any requirement of the board of trade.

11. The lever controlling the link motion reversing gear of a crane or winch used in the processes shall be provided with a suitable spring or other locking arrangement.

12. Every shore crane used in the processes shall have the safe load plainly marked upon it, and if so constructed that the jib may be raised or lowered either shall have attached to it an automatic indicator of safe loads or shall have marked upon it a table showing the safe loads at the corresponding inclinations of the jib.

13. The driver's platform on every crane or tip driven by mechanical power and used in the processes shall be securely fenced, and shall be provided with safe means of access.

14. Adequate measures shall be taken to prevent exhaust steam from any crane or winch obscuring any part of the decks, gangways, wharf, or quay, where any person is employed.

PART IV.

15. No machinery or gear used in the processes, other than a crane, shall be loaded beyond the safe load; nor a crane, unless secured with the written permission of the owner by plates or chains or otherwise.

No load shall be left suspended from a crane, winch, or other machine unless there is a competent person actually in charge of the machine while the load is so left.

16. A boy under 16 shall not be employed as driver of a crane or winch, or to give signals to a driver, or to attend to cargo falls on winch ends or winch bodies.

17. Where in connection with the processes goods are placed on a wharf or quay other than a wharf or quay on a shallow canal: (*a*) A clear passage leading to the means of access to the ship required by regulation 4 shall be maintained on the wharf or quay; and (*b*) if any space is left along the edge of the wharf or quay, it shall be at least 3 feet wide and clear of all obstructions other than fixed structures, plant, and appliances in use.

18. No deck stage or cargo stage shall be used in the processes unless it is substantially and firmly constructed and adequately supported, and, where necessary, securely fastened.

No truck shall be used for carrying cargo between ship and shore on a stage so steep as to be unsafe.

Any stage which is slippery shall be made safe by the use of sand or otherwise.

19. Where there is more than one hatchway, if the hatchway of a hold exceeding 7 feet 6 inches in depth, measured from the top of the coamings to the bottom of the hold, is not in use and the coamings are less than 2 feet 6 inches in height, it shall either be fenced to a height of 3 feet or be securely covered.

Provided, That this regulation shall not apply during meal times or other temporary interruptions of work during the period of employment.

And provided, That until the 1st of January, 1908, the fending may be the best the circumstances will allow without making structural alteration.

Hatch coverings shall not be used in connection with the processes in the construction of deck or cargo stages, or for any other purpose which may expose them to damage.

20. No cargo shall be loaded by a fall or sling at any intermediate deck unless a secure landing platform has been placed across the hatchway at that deck.

PART V.

21. No person shall, unless duly authorized, or in case of necessity, remove or interfere with any fencing, gangway, gear, ladder, life-saving means or appliances, lights, marks, stages, or other things whatsoever, required by these regulations to be provided.

22. The fencing required by regulation 1 shall not be removed except to the extent and for the period reasonably necessary for carrying on the work of the dock or ship, or for repairing any fencing. If removed it shall be restored forthwith at the end of that period by the persons engaged in the work that necessitated its removal.

PART VI.

23. No employer or persons in the processes shall allow machinery or gear to be used by such persons in the processes that does not comply with Part III of these regulations.

24. If the persons whose duty it is to comply with regulations 4, 5, and 7 fail so to do, then it shall also be the duty of the employers of the persons employed for whose use the means of access and the lights are required to comply with the said regulation within the shortest time reasonably practicable after such failure.

25. The certificate of the ship's register and any other certificate or register referred to in these regulations shall be produced by the person in charge thereof on the application of any of His Majesty's inspectors of factories.

A. AKERS-DOUGLAS,
One of His Majesty's Principal Secretaries of State.

HOME OFFICE, *Whitehall, 24th October, 1904.*

FACTORY ENGINES AND CARS.

Whereas the use of locomotives, wagons, and other rolling stock on lines of rail or sidings in any factory or workshop or any place to which the provisions of section 79 of the factory and workshop act, 1901, are applied by that act, or on lines of rail or sidings used in connection with any factory or workshop or any place as aforesaid, and not being part of a railway within the meaning of the railway employment (preventions of accidents) acts, 1900, has been certified in pursuance of the said section to be dangerous:

I hereby, in pursuance of the powers conferred upon me by that act, make the following regulations and direct that they shall apply to all places before mentioned.

These regulations shall come into force on the 1st day of January, 1907, except regulations 1, 2, and 22, which shall come into force on the 1st day of January, 1908.

Subject to the exemptions below, it shall be the duty of—(*i*) The occupier of any factory or workshop and any place to which any of the provisions of the factory and workshop act, 1901, are applied, and (*ii*) the occupier of any line of rails or sidings used in connection with a factory or workshop, or with any place to which any of the provisions of the factory and workshop act, 1901, are applied, to comply with Part I of these regulations.

And it shall be the duty of every person who by himself, his agents or workmen, carries on any of the operations to which these regulations apply, and of

all agents, workmen, and persons employed to comply with Part II of these regulations.

And it shall be the duty of every person who by himself, his agents, or workmen, carries on any of the operations to which these regulations apply, to comply with Part III of these regulations.

In these regulations:

Line of rails means a line of rails or sidings for the use of locomotives or wagons excepting such lines as are used exclusively for (*a*) a gantry crane or traveling crane, or (*b*) any charging machine or other apparatus or vehicle used exclusively in or about any actual process or manufacture.

Wagon includes any wheeled vehicle or nonself-moving crane on a line of rails.

Locomotive includes any wheeled motor on a line of rails used for the movement of wagons and any self-moving crane.

Gantry means an elevated structure of wood, masonry, or metal, exceeding 6 feet in height and used for loading or unloading, which carries a line of rails, whereon wagons are worked by mechanical power.

Nothing in these regulations shall apply to:

(*a*) A line of rails of less than 3 feet gauge, and locomotives and wagons used thereon.

(*b*) A line of rails not worked by mechanical power.

(*c*) A line of rails inside a railway goods warehouse.

(*d*) A line of rails forming part of a mine within the meaning of the coal mines regulation act, 1887, or of a quarry within the meaning of the quarries act, 1894, not being a line of rails within or used solely in connection with any factory or workshop not incidental to the maintenance or working of the mine or quarry or to the carrying on of the business thereof.

(*e*) Pit banks or mines to which the metalliferous mines regulation act, 1872, applies, and private lines of rails used in connection therewith.

(*f*) Lines of rails used in connection with factories or workshops, so far as they are outside the factory or workshop premises, and used for running purposes only.

(*g*) Wagons not moved by mechanical power.

(*h*) Buildings in course of construction.

(*i*) Explosive factories or workshops within the meaning of the explosives act, 1875.

(*j*) All lines and sidings on or used in connection with docks, wharves, and quays not forming part of a factory or workshop as defined in section 149 of the factory and workshop act, 1901.

(*k*) Wagon or locomotive building or repairing shops, and all lines and sidings used in connection with such shops if such shops are in the occupation of a railway company within the meaning of the regulation of railways act, 1871.

(*l*) Depots or car sheds being parts of tramways or light railway undertakings authorized by Parliament, and used for the storage, cleaning, inspection, or repair of tramway cars or light railway cars.

PART I.

1. Point rods and signal wires in such a position as to be a source of danger to persons employed shall be sufficiently covered or otherwise guarded.

2. Ground levers working points shall be so placed that men working them are clear of adjacent lines, and shall be placed in a position parallel to the adjacent lines, or in such other position, and be of such form as to cause as little obstruction as possible to persons employed.

3. Lines of rails and points shall be periodically examined and kept in efficient order, having regard to the nature of the traffic.

4. Every gantry shall be properly constructed and kept in proper repair. It shall have a properly fixed structure to act as a stop-block at any terminal point; and at every part where persons employed have to work or pass on foot there shall be a suitable footway, and if such footway is provided between a line of rails and the edge of the gantry the same shall, so far as is reasonably practicable, having regard to the traffic and working, be securely fenced at such a distance from the line of rails as to afford a reasonably sufficient space for such persons to pass in safety between the fence and a locomotive, wagon, or load on the line of rails.

5. Coupling poles or other suitable mechanical appliances shall be provided where required for the purpose of regulation 11.

6. Proper sprags and scrotches, when required, shall be provided for the use of persons in charge of the movement of wagons.

7. Where, during the period between one hour after sunset and one hour before sunrise, or in foggy weather, shunting or any operations likely to cause danger to persons employed are frequently carried on, efficient lighting shall be provided either by hand lamps or stationary lights, as the case may require, at all points where necessary for the safety of such persons.

8. The mechanism of a capstan worked by power and used for the purpose of traction of wagons on a line of rails shall be maintained in efficient condition, and if operated by a treadle, such treadle shall be tested daily before use.

PART II.

9. When materials are placed within 8 feet of a line of rails and persons employed are exposed to risk or injury from traffic by having to pass on foot over them or between them and the line, such material shall, as far as reasonably practicable, be so placed as not to endanger such persons, and there shall be adequate recesses at intervals of not more than 20 yards where the materials exceed that length.

10. No person shall cross a line of rails by crawling or passing underneath a train or wagons thereon where there may be a risk of danger from traffic.

11. Locomotives or wagons shall wherever it is reasonably practicable without structural alterations be coupled or uncoupled only by means of a coupling pole or other suitable mechanical appliance, except where the construction of locomotives or wagons is such that coupling or uncoupling can be safely and conveniently performed without any part of a man's body being within the space between the ends or buffers of one locomotive or wagon and another.

12. Sprags and scrotches shall be used as and when they are required.

13. Wagons shall not be moved or be allowed to be moved on a line of rails by means of a prop or pole, or by means of towing by a rope or chain attached to a locomotive or wagon moving on an adjacent line of rails when other reasonably practicable means can be adopted; provided that this shall not apply to the movement of ladles containing hot material on a line of rails in front of and adjacent to a furnace.

In no case shall props be used for the above purpose unless made of iron, steel, or strong timber, hooped with iron to prevent splitting.

14. Where a locomotive pushes more than one wagon, and risk of injury may thereby be caused to persons employed, a man shall, wherever it is safe and reasonably practicable, accompany or precede the front wagon or other efficient means shall be taken to obviate such risk.

Provided that this regulation shall not apply to the following:

(*a*) Fly shunting.

(*b*) Movement of wagons used for conveyance of molten or hot material or other dangerous substance.

15. No person shall be upon the buffer of a locomotive or wagon in motion unless there is a secure handhold, and shall not stand thereon unless there is also a secure foot place; nor shall any person ride on a locomotive or wagon by means of a coupling pole or other like appliance.

16. No locomotive or wagon shall be moved on a line of rails until warning has been given by the person in charge to persons employed whose safety is likely to be endangered.

Provided that this regulation shall not apply to a self-moving crane within a building or to a charging machine or other vehicle so long as it is used in or about any actual process of manufacture.

17. Where persons employed have to pass on foot or work, no locomotive or wagon shall be moved on a line of rails during the period between one hour after sunset and one hour before sunrise, or in foggy weather, unless the approaching end, wherever it is safe and reasonably practicable, is distinguished by a suitable light or accompanied by a man with a lamp.

Provided that this regulation shall not apply to the movement of locomotives or wagons within any area which is efficiently lighted by stationary lights.

18. The driver in charge of a locomotive, or a man preceding it on foot, shall give an efficient sound signal as a warning on approaching any level crossing over a line of rails regularly used by persons employed, or any curve where sight is intercepted, or any other point of danger to persons employed.

19. A danger signal shall be exhibited at or near the ends of any wagon or train of wagons undergoing repair wherever persons employed are liable to be endangered by an approaching locomotive or wagon.

20. (*a*) The space immediately around such capstan as mentioned in regulation 8 shall be kept clear of all obstruction.

(*b*) Such capstan shall not be set in motion until signals have been exchanged between the man in charge of the capstan and the man working the rope of chain attached to it.

(*c*) No person under 18 years of age shall work such capstan.

21. No person under the age of 18 shall be employed as a locomotive driver, and no person under the age of 16 shall be employed as a shunter.

PART III.

22. All glass tubes or water gauges on locomotives or stationary boilers used for the movement of wagons shall be adequately protected by a covering or guard.

H. J. GLADSTONE,
One of His Majesty's Principal Secretaries of State.

HOME OFFICE, *Whitehall, 24th August, 1906.*

APPENDIX C.

The following is a letter received from Prof. H. W. Wiley, Bureau of Chemistry, United States Department of Agriculture:

WASHINGTON, D. C., *November 4, 1908.*

Mr. GEORGE M. KOBER,
923 H Street NW., Washington, D. C.

DEAR SIR: Your favor of October 27 at hand, and in reply desire to state that the question of drug habit has received considerable attention by the division of drugs, and could place at your disposal much valuable information. We are collecting this information as rapidly as possible and expect in the near future to submit to the Secretary for approval and publication a bulletin dealing with acetanilid, antipyrin, and phenacetin.

We also are in possession of information as to the institutions and their methods of treating unfortunate drug habitues, particularly those addicted to the use of opium, morphine, cocaine, etc.

I am inclosing copies of two bills which were introduced at the last session of Congress. The object of these bills is to regulate and minimize the evil at present resulting from the indiscriminate sale and use of the agents enumerated therein. If you could make it convenient to visit the drug laboratory of this bureau we would be in a position to place at your disposal much information which would be of great assistance to you in your work.

Respectfully,

H. W. WILEY, *Chief.*

The following is a letter received from Dr. Lyman F. Kebler, chief, division of drugs, United States Department of Agriculture:

WASHINGTON, D. C., *November 21, 1908.*

Dr. GEORGE M. KOBER,
1819 Q Street, Washington, D. C.

DEAR SIR: I am herewith transmitting data on the following subjects: The harmful effects of acetanilid, antipyrin, and acetphenetidin (phenacetin); cancer cures; female pills; soft drinks containing caffeine, etc.; the dope question; consumption cures; habit cures, and prescription nostrums. I did not include the list of headache remedies, for the reason that they are not as yet complete. We have found approximately 365 which have a fairly large sale—that is, more than the local sale of a drug store—but not more than one-half of same have been investigated in the division of drugs. I shall be pleased to forward you the entire list, with the understanding that there might be one or two which are not actually headache remedies, but are believed to be such from the trading name.

Respectfully,

L. F. KEBLER,
Chief, Division of Drugs.

SOFT DRINKS CONTAINING CAFFEINE AND EXTRACTS OF COCA LEAF AND KOLA NUT.

[By LYMAN F. KEBLER, M. D., Ph. D., Chief, Division of Drugs, U. S. Department of Agriculture.]

During the past decade soda-fountain specialties containing caffeine, extract of kola nut and extract of coca leaf, the active principle of which is cocaine, have been offered in considerable quantities and, due to extensive and attractive advertising, both as beverages and as headache remedies and nerve tonics, their sale has assumed large proportions.

The first appearance of preparations of this type was in the South in the eighties, their introduction following the success which Moxie had attained in the East, though this particular drink was of an entirely different character. From the South the demand spread to other sections and the number of products has increased until at the present time there are probably over one hundred of them bottled and sold all over the United States. The greatest demand is still in the South, however, and almost every drug store, confectionery shop, and fruit stand has its favorite product on sale. The carbonated goods in bottled form are offered on the trains. People of all classes, young and old, delicate women, and even little children consume these beverages indiscriminately and no warning is ever given of the baneful effect of the powerful habit-forming drugs concealed therein. It is therefore small wonder that the prevalence of the so-called "coca cola fiend" is becoming a matter of great importance and concern.

It is well known that some of these products are mixed under the most unsanitary conditions. The sugar, water, and drug material will be dumped into a pot standing in the cellar of some low building, or even a stable, where the ceiling is covered with dust, cobwebs, and dirt of all descriptions and the floor littered with filth. The steam from the boiling kettle, condensing on the ceiling, collects the dirt in the drops of water and this soon falls back into the mixture. Again, the sirup will boil over onto the floor and a sticky mass remains which soon collects straw and filth of all descriptions and becomes a rendezvous for flies and other vermin, for usually no attempt is made to clean it up.

Judging from the names of most of these products it would appear that extract of kola nut is one of the chief ingredients, and, while in certain instances this drug is undoubtedly present, in most cases the caffeine has been added as the alkaloid caffeine obtained from refuse tea sweepings or made artificialy from uric acid occurring in the Guano deposits of South America, or in the citrated form, and the sirup colored with caramel. The cocaine found is usually added in the form of extract of coca leaf. Some of the manufacturers claim that the extract used is prepared from a decocainized coca leaf, the refuse product discarded in the manufacture of cocaine.

An investigation of these products was undertaken about a year ago and it was found that the following products contained both caffeine and extract of coca leaf:

Afri Cola, The Afri Cola Co., Atlanta, Ga.
Ala Cola, Ala Bottling Works, Bessemer, Ala.
Cafe Coca, Athens Bottling Works, Athens, Ga.
Carre Cola, E. Carre Co., Mobile, Ala.
Celery Cola, The Celery Cola Co., Birmingham, Ala.; Dallas, Tex.; Nashville, Tenn., and St. Louis, Mo.
Chan Ola, L. M. Channell, New Orleans, La.
Chera Cola, Union Bottling Works, Columbus, Ga.
Coca Beta, the Coca Beta Co., New York City.
Coca Beta, Southern California Supply Co., Los Angeles, Cal.
Coca Cola, Coca Cola Co., Atlanta, Ga.
Pilsbury's Coke, A. L. Pilsbury, jr., Co., New Orleans, La.
Cola Coke, Lehman-Rosenfeld Co., Cincinnati, Ohio. (This preparation was formerly sold under the name of Rocco Cola.)
Cream Cola, Jebeles & Callas Co., Birmingham, Ala.
Dope, Rainbow Bottling Co., Atlanta, Ga.
Four Kola, Big Four Bottling Works, Waco, Tex.
Hayo Kola, Hayo Kola Co., Norfolk, Va.
Heck's Cola, Heck & Co., Nashville, Tenn.
Kaye Ola, A. W. Kaye, Meridian, Miss.
Koca Nola, Koca Nola Co., Atlanta, Ga.
Koke, Coleman & McKeever, Frankfort, Ky.

Kola Ade, Wiley Manufacturing Co., Atlanta, Ga.
Kola Kola, W. J. Stange Co., Chicago, Ill.
Kola Phos, John Wyeth & Bro., Philadelphia, Pa.
Koloko, Halberg Bottling Works, Mobile, Ala.
Kos Kola, Sethness Co., Chicago, Ill.
Lime Cola, Alabama Grocery Co., Birmingham, Ala.
Lima Ola, Wine Brew Co., Macon, Ga.
Mellow Nip, Rainbow Bottling Co., Atlanta, Ga.
Nerv Ola, Henry K. Wampole & Co., Philadelphia, Pa.
Revive Ola, O. L. Gregory Vinegar Co., Birmingham, Ala.
Rocola, American Manufacturing Co., Savannah, Ga.
Rye Ola, Rye Ola Co., Birmingham, Ala.
Standard Cola, The Standard Bottling Co., Denver, Colo.
Toka Tona, California Commercial Co., Los Angeles, Cal.
Tokola, Samuel Smith & Co., Chicago, Ill.
Vani Kola, Vani Kola Company, Canton, Ohio.
Vim-O, Vim-O Company, Eagle Lake, Tex.
French Wine of Coca, Wine of Coca Co., Boston, Mass.
Wise Ola, The Wise Ola Co., Birmingham, Ala.

The following preparations were found to contain caffeine, but there was no evidence to the effect that coca leaf in any form had been used in their manufacture:

Calycine, Calycine Co., Norfolk, Va.
Celery Cocoa, Celery Cocoa Co., Los Angeles, Cal.
Citro Cola, Miners Fruit Nectar Co., Boston, Mass.
Deep Rock Ginger Ale, Abney Bros., Athens, Ga.
Fosko, E. Carre Co., Mobile, Ala.
Heck's Star Pepsin, Mrs. Ida Heck, Nashville, Tenn.
Koke, Coan & Harbin, Bluff City Bottling Co., Memphis, Tenn.
Koke Ola, Eagle Bottling Co., Frankfort, Ky.
Kalafra, Mead Johnson Co., Jersey City, N. J.
Kumfort, The Kumfort Co., Atlanta, Ga.
Lime Juice and Kola, Parke Davis & Co., Detroit, Mich.
Lon Kola, Lon Kola Co., Danville, Ky.
Meg-O, Parr Bros., Baltimore, Md.
Mexicola, Celiko Bottling Works, Raleigh, N. C.
Pau Pau Cola, Pau Pau Cola Co., Detroit, Mich.
Pedro, N. J. Parker & Co., Washington, D. C.
Pepsi Cola, C. D. Bradham, New Bern, N C.
Speed Ball, E. Pilzer, Speed Ball Co. (Inc.), Washington, D. C.
To-Ko, The To-Ko Company, Hagerstown, Md.
Vril, Brand Bros., Chicago, Ill.

Besides the above preparations which have been analyzed a number were reported from different parts of the country but no samples were submitted. From their names, and from what evidence there was submitted, they contain either caffeine of coca leaf extract, or both:

Charcola, H. C. Metzger, Meridian, Miss.
Cherry Kola, Williamsport, Pa.
Cola Soda, Jacob House & Sons, Buffalo, N. Y.
Coca Ginger, National Beverage Co., Atlanta and Chattanooga.
Field's Cola, H. C. Field, High Point, N. C.
Imported French Cola, Alabama Grocery Co., Birmingham, Ala. (Claimed to be carbonated Wiseola.)
Jacob's Kola, Tampa, Fla.
Koko Ale, Salt Lake City Soda Water Co., Salt Lake City.
Kola Cream, The Henzerling Co., Baltimore, Md.
Kola Pepsin Celery Wine Tonic, W. J. Miller, Cleveland, Ohio.
Kola Vena.
Loco Kola, Norton, Va.
Mintola, Davis Kelley Co., Louisville, Ky.
Mate, Mississippi Ice Co., Clarksdale, Miss.
Pikmeup, Scales, Wilson Co., Greenville, S. C.
Ro-Cola, Savannah, Ga.
Schelhorns Cola, Evansville Bottling Co., Evansville, Ind.
Vine Cola, California Commercial Co., Los Angeles, Cal.
Viz, Alabama Grocery Co., Birmingham, Ala. (Claimed to be carbonated Wiseola.)

HABIT CURES.

[By LYMAN F. KEBLER, M. D., Ph. D., Chief, Division of Drugs, U. S. Department of Agriculture.]

Nostrums for the cure of the drug and liquor habits are widely advertised throughout the country in the public press. A request for further information with regard to the subject of one of the advertisements is followed by the receipt of printed matter setting forth the virtues of the remedy, and a "symptom blank" whereon the inquirer is expected to state over his signature the kind of drug he is using and the dose which he is accustomed to take daily. Upon returning this blank, filled out, the inquirer is informed as to the price at which the remedy in quesion can be procured. This is usually at a specified price per bottle, or treatment, treatment being reckoned by the month. Some concerns do not employ the symptom blank, but sell their products to all who apply, without question. In almost every case the remedy contains a generous proportion of an opiate, usually in the form of morphine. Ostensibly the treatment is based upon the reduction plan; the patient is advised to give up the use of the drug which he was formerly taking and to depend entirely upon the remedy, and to reduce the daily dose of this at regular intervals until he finally does away with its use entirely. This, as a matter of fact, he never does, because he finds it just as difficult to break away from the morphine-containing "support" as from the straight morphine which he formerly took. Meantime the concern which furnishes the nostrum reaps pecuniary benefit.

Most of the nostrums for the cure of the liquor habit depend for their efficacy upon the nauseating qualities of the ingredients which they contain. * * * The remedy can be taken voluntarily by the patient himself, or administered secretly by introducing it surreptitiously into his food or drink. Promises of a most alluring character are held out with regard to the latter method of administration, and the wives and mothers of drunkards have been known to go great lengths to procure the money wherewith to purchase these nostrums. The result of both methods of administration is the same—the patient's stomach and digestion are injured, perhaps permanently, and no real good is accomplished. A list of the "cures" for the drug and alcohol habit is given below.

HABITS.

Drug cures.

W. J. Carney, 567 Lebanon street, Melrose, Mass. (Opium.)
St. Paul Association, 46–48 Van Buren street, Chicago. (Drugs.)
Purdy Sanitarium, 614½ Fannin street, Houston, Tex.
Harris Institute, 400 West Twenty-third street, New York. (Drugs.)
O. P. Coates Co., 917–919 New York Life Building, Kansas City. (Drugs.) Habitina.
Dr. Stewart-Hord Sanitarium, 360 Franklin avenue, Shelbyville, Ind. (Drugs.)
Waterman Institute, 14–18 Lexington avenue, New York. (Drugs.)
Cedarcroft Sanitarium, Lebanon, Tenn.
New Malay Opium Cure, Rev. J. C. Ives, 134 East Twenty-fifth street, New York.
"99" Morphine & Opium Cure, Krouskeep, Clark and Van Buren streets, Chicago.
St. James Society, Suite 245, 1181 Broadway, New York. (Drugs.)
Manine Medical Co., 3201 Locust street, St. Louis. (Drugs.)
B. M. Wolley Co., Atlanta, Ga., Box 387. (Opium, whisky, etc.)
Alexander Coöperative Sanitarium Co., Fulton, Ky.
Dr. W. A. Stearns, Atlanta, Ga.
Dr. W. J. Tucker, Atlanta, Ga.
Dr. L. F. Myers, Columbus, Ga.
Dr. G. W. D. Patterson, Atlanta, Ga.
The Acme Opium Cure, Kirkwood, Ga.
James Sanitarium, Memphis, Tenn.
Drug Crave Crusade, 41 Union Square, New York.
Dr. J. L. Stevens Co., Lebanon, Ohio. Hyoscin.
Comstock Remedy Co., Lafayette, Ind. (Fluid Extract Coca.)
National Aid Society, 134 East Twenty-fifth street, New York.

Windsor Laboratories, 134 East Twenty-fifth street, New York. Malay Opium Co.
Richie Co., 105 St. James Place, Brooklyn, N. Y.
Mackay Treatment Co., 61 Maiden Lane, New York.
Scientific Remedy Co., 45 West Thirty-fourth street, New York.
Oppenheimer Institute, 159 West Thirty-fourth street, New York.
Mrs. Carney, 567 Lebanon street, Melrose, Mass.
World Remedy Co., Syracuse, N. Y.
H. C. Keith, Losantville, Ind.
The Dr. Koonse Cure, 812 Calhoun street, Ft. Wayne, Ind.
Compound Oxygen Association, 125 Douglas avenue, Ft. Wayne, Ind.
Awaine's Antidote Sanitarium, Cleveland, Ohio, 3781 Cedar avenue.
Dr. Rutledge Medical Institute, 477 Ellicott Square, Buffalo, N. Y.
Lanoix Cure Co., Kansas City, Mo.
Dr. W. J. McKanna, Reidsville, N. C.
Delta Chemical Co., St. Louis, Mo.

Alcohol.

Orrine. (Alcohol.)
White Ribbon Remedy Co., 218 Tremont street, Boston.
Dr. J. W. Haines, 1515 Gleen Building, Cincinnati, Ohio.
The Dr. Brannaman Cure, 210 Chaman Building, Kansas City.
Aur-Mon-O, 110 West Thirty-fourth street, New York.
James Sanitorium, Memphis, Tenn.
Mrs. Margaret Anderson, 512 Home avenue, Hillburn, N. Y.
Physicians Co-operative Association, Chicago.
Parker Willis, 16 State Life building, Indianapolis, Ind.
Kansas Anti-Liquor Society, 601 Gray Buildings, Kansas City.
Trunk Bros. Drug Co., 400-402 Sixteenth street, Denver, Colo. (Cigarette habit.)
Rogers Drug & Chemical Co., "Easy to Quit," 1962 Fifth and Race streets, Cincinnati.

DR. KEELER'S LIST OF HEADACHE REMEDIES.

A. B. C. Headache Powders.
Acetafein (O. C. & Son).
Acetalix.
Acetanilide Comp. U. S. P.
Acetanol. Headache Powders.
Ache-Head.
Acme Headache Wafers.
A. D. S. Headache Wafers.
Dr. Agnew's Headache Tablets.
Ake-in-the-Head-Tablets.
Alex Harmless Headache Powders.
Allen's Headache Powders.
Alpha Headache Wafers.
Ammonol.
Analgia (Merrell's) Tablets.
Analgine.
Anti-headache (Davis).
Anti-Headache Moroneys.
Antikamnia.
Anthony's Headache Powders.
Anti-Pain Pills.
Armstrong's Headache Powder.
Atkinson's "99."
Babcock's Headache Pills.
"Bar-Ben" Formula A, for headache.
Barton's Headache Powders.
Beck's Little Wonder Headache Powders.
Beck's Universal Headache Tablets.
Beekman Headache Wafers.
Bell's Coryza Tablets.
Bensen's Headache Powders.
Benter's Headache Powders.
Bergwall's Acme Headache Wafers.
Big 4 Headache Powders.
Billington's Headache Powder.
Bi-Lo-Zone.
Bird's Headache Tablets.
Block's Headache Cure.
Dr. Bob's Headache Powder.
Dr. Bonker's Headache Powder.
Bouchard's Capsules.
Boulanger's Headache Cure.
Bovine Headache Powder.
Brain Food. (Harper's.)
Brangeine.
Brant's Headache Tablets.
Brazilian Compound Anti-Headache Tablets.
Broa's Headache Powders.
Bromo Caffeine. (K. & M.)
Bromo-Celery. (Arnold.)
Bromo Compound. (Arnold's.)
Bromodine for Headache.
Bromo-kamnia.
Bromoline.
Bromo Lithia.
Bromonia.
Bromo-Quinine-Laxative.
Bromo-Seltzer.
Bromo-Soda. (Warner's.)
Bromo-Tanilid.

Bromo Vichy.
Bromo Vin.
Brook's Headache Powder.
Bro-tanilid.
Brow-ease.
Bull's Headache Specific.
Caf-Aceton. (Wyeth's.)
Caffeine Compound.
Campaign Headache Tablets.
Capudine.
Carey's Heart Tonic Headache Wafers.
Cascara Bromide Quinine. (Hill's.)
Catarrh & Headache Snuff. (Marshall's.)
Celery-Caffeine. (Chelf's.)
Celery & Caffeine Bromide. (French's.)
Celery Fomo.
Celery Tea.
Celery Vesce.
Cencura. For headache.
Cephalgine.
Cephaline.
Cerralgine.
Chinese Headache Cure.
Dr. Clay's Headache Powders.
Clover Headache Powders.
Coffee-no.
Cold Capsules. (Stott's.)
Cole's Headache Cure.
Cole's Headache Powder.
Coppai's Headache Cure.
Coronet Headache Cure. (Bacon.)
Courney's Headache 15 minutes.
Cran-O-Tone.
Craemer's Headache Powders.
Crown Headache Powder.
Curalgia.
Daggett & Ramsdell's Headache Powder.
Daisy Headache Powder.
Daisy Headache Wafer.
Dale, Hart & Co.'s Headache Powder.
Darling's Cold Cure.
Darlington's Headache Powder.
Davidson's Headache Powders.
Davis's Headache Cure.
De Kalb's Anti-Headache Powders.
De Kay's Headache Wafers.
De Loste's Headache Powders.
Dick's Laxative Cold Cure.
Dilliard's Headache Powder.
Doris's Headache Buttons.
Dutton Headache Powders.
Duff's Headache Specific.
Eames's Tonic Headache Wafers.
Ebb's Kolo Caffeine Headache Tablets.
Eddy's Headache Specific.
Eesee's Headache Cure.
Electric Headache Powder.
Empire Headache Wafers.
Eureka Headache Powder.
Eureka Headache Cure.
Fabra's Headache Cure.
Failing's Headache Powder.
Falck's One Minute Headache Cure.
Father Schubert's Little Headache Tablets.
Fisher's Headache Capsules.
Fisher's Quick Headache Cure.
Five Minute Headache Powder.
Flag Salt.
Flower's Sure Headache Cure.
Dr. Foote's Headache Powder.
Fowler's Magic Headache Powder.
Garfield Headache Powders.
Geneseo Headache & Neuralgia Remedy.
G. E. S. S. Headache Tablets.
Gessler's Headache Wafers.
Getman's Headache Powder.
Gibson's Instant Headache Cure.
Gipsy Headache Wafers.
Goldsmith's Headache Wafers.
Goll's Dollar Headache Cure.
Good's Headache Cure.
Gregory's Headache Powder.
Groeser's Headache Cure.
Guarana Compound.
Guy's Headache Powder.
Hageman's Headache Wafers.
Haller's Headache & Neuralgia Cure.
Haller's Relief Headache Powder.
Hall's One-Minute Headache Cure.
Hantz's Headache Tablets.
Harmless Headache Powder.
Dr. Hart's Headache Powder.
Hartwig's Headache Tablets.
Hawley's Celery Headache Capsules.
Head-A-Cure.
Headache Antidote. (Edward's.)
Headache Chocolates.
Headache Konseals.
Headache Powders. (Kellogg & Carrier.)
Headachine.
Headache Stop.
Head-Ease. (Bethea's Liquid.)
Head-Ease. (Cumming's.)
Head-Ease. (Peter-Heat-Richardson's.)
Head-Ease. (White's.)
Head-Easy. (Stedman's.)
Headline.
Headache Kolone.
Headache Kuro.
Headoria. (Pearson's.)
Hed-ake. (Preston's.)
Hedakur. (Hasson's.)
Hed-Kure. (Saenger's.)
I. N. Hegeman & Co., Headache Powder.
Henry's (Dr.) Headache Powder.
Hick's Capudine.
Hobson's Headache Cure.
Hoffman's Harmless Headache Powder.
Hogan's Headache Powder.
Holland's Headache & Neuralgia Powder.
Holloway's Headache Powder.
Howe's Headache Cure. (P. M. Co.)
Hufeland's Sure Headache Cure.
Hutchin's Headache Pills.
I. C. R. Cold & Catarrh Relief.

Imperial Headache Powder.
Instant Headache Wafers. (Brown & Hoff.)
I. S. M. A. Caffanilid.
James's Headache & Liver Pills.
Dr. J. W. James's Miniature Headache Powder.
Japanese Rapid Headache Powder.
Johnson's Headache Powder.
Johnson's Utah Headache Salt.
Jones's Cold & Grippe Cure.
Joslyn's Instant Headache Tablets.
Kahle's Headache Powder.
Kali-Caffein. (Claimed to be a salt.)
Kalluorine. Headache Powder.
Kapitol Headache Wafers.
Kef.
Kelly's Headache Cure.
Kennedy's Headache Powder.
Kennedy's Headache Tablets.
King's Headache Tablets.
Knox-a-Cold Tablets.
Knill's Orange Headache Pills.
Kohler's Headache Powders.
Koladine.
Kolo-Caffein.
Kolone. (Lakin's Hedake.)
Koos' Nervine Headache Powder.
Kopfaline.
Kramer's Headache Capsules.
Kra-Nol.
Krause's Headache Capsules.
La Belle Headache Tablets.
Lake's Headache Powder.
Lamprey's Headache Cure.
Lane's Headache Capsules.
Lants's Gold Coin Headache Cure.
Lawrence's Headache Powder.
Laxacold.
Laxative Bromo Quinine. (Paris Med. Co.)
Lemon Seltzer.
Lemke's Headache Powder.
Lesage's Headache Specific.
Leslie's Headache Prescription.
Dr. Little's Headache Specific.
Little Wonder Headache Powder.
Dr. Lord's Headache Powder.
Dr. Lung's Headache Powder.
Magnet Headache Cure.
Marquet's Headache Wafers.
Martin's Headache Cure.
Man's Headache Powder.
McGale's Headache Cure.
McGrath's Headache & Neuralgia Tablets.
Malydor Injection.
Megrimine. (Whitehall's.)
Metzger's Headache Tablets.
Meyer's Headache & Neuralgia Cure.
Microtine. (Lepper's.)
Migrainin. (Baker's.)
Migrainoes. (Digestine Co.)
Migrain Tablets for Headache.
Migrain Tablets. (Squibbs'.)
Migrane Tablets.
Miles's Anti-Pain Pills.
Momad's Headache Capsules.
Moore's Harmless Headache Powder.
Morgan's Headache Wafers.
Morin's (Dr. Ed.) Headache Wafers.
Morrison's Headache Cure.
Moyer's Headache Tablets.
Mueller's German Headache Powder.
Munyon's Headache Remedy.
Narco Headache Remedy.
Narco Cold Tablets.
Natronilid. (Peck.)
Nature's Headache Tablets.
Nervease Powders.
Neuralgolyne.
Neuralgia Capsules.
Neuralgine.
Neuralgyline.
New Era Headache Cure.
"999" Headache Powder.
Now or Never Headache Powder. (H M. Co.)
Nyal's Headache Cure.
Oa Oa Headache Powder.
O. K. Headache Cure. (Houston Drug Co.)
Olusa Headache Powders.
Omega Headache Powders. (Babcock's.)
Orangeine.
Orien's Headache Cure.
Otto's "Such A" Headache Powder.
Pain in Your Head. (Cooper's.)
Pain King. (John's.)
Pain King. (Shaker's)
Pain Paint. (Goll's.)
Pain Paint. (Wolcott's.)
Paragon Headache Remedy.
Parker's Headache Powder.
Pasteur's Stop a Pain Tablets.
Peck's Headache Powder.
Peek's Headache Powder.
Peerless Headache Powder.
Perfection Headache Wafers.
Perrine's Quick Relief. Headache Powder.
Perry's Headache Powder.
Perry's Headache Wafers.
Phenalgine.
Phenine. Headache Powder.
Phenokola. Headache Powder. (B. & S.)
Phenolgin.
Phenyo-Caffein.
Phospho-Caffeine Compound.
Platt's Headache Wafers.
Positivus Headache Tablets.
Poythress Cold & Grippe Cure.
Preston's Hed-Ake Cure.
Princess Headache Powder.
Pusbeck's Cold Tablets.
Quaker Headache Capsules.
Quick Cure. (Dr. Wood's.)
Quick Relief Headache Cures.
Quickstop. (Mattison's.)
Ramee's Sick Headache Remedy.

Ramsey's Headache Elixir.
Raphael's Headache Wafers.
Rawleigh's Quinine 15 Minute Tablets.
Red Dragon Seltzer.
Rennard's Headache Remedy.
Requa's Headache Powder.
Rexall Headache Pills.
Rexall Headache Powder.
Rexall Tablets.
Richardson's Headache Powder.
Rich's Headache Powder.
Rough on Headache Tablets.
Royal Headache Powder.
Royal Headache Tablets.
Salvitae Headache Tablets.
Sanderson's Headache Cure.
Sand Mountain Headache Tablets.
Sanitatis Headache Tablets.
Sano Headache Cure.
Sawyer's Headache Powder.
Schmidt's Headache Cure.
Schrader's Headache Powder.
Shilling's Bromo Headache Tablets.
Shoop's 20-Minute Headache Tablets.
Shrader's 10-Minute Headache Powder.
Solan's Headache Wafers.
Soda Caffo Headache Tablets.
So-Doc. Headache Cure.
Spen's Headache Tablets.
Stanton's Harmless Headache Powder.
Schwalb's Electric Headache Powder.
S. & D.'s Headache Salt.
Severa's Headache & Neuralgia Wafers.
S. & H.'s Headache Salt.
Shac-Stearn's Headache Cure.
Sherlou's Headache Powder.
Sherman's Headache Cure.
Stark's Headache Powder.
Stearn's Headache Cure.
Stewart's (Dr.) Headache Powder.
Scott's Cold & Grippe Tablets.
Sunshine Headache Powder.
Swift's (Dr.) Headache Cure.
Talbot's Headache Wafers.
Taylor's Headache Powder.
Ten Thousand Dollar Headache Tablets.
Thieman's Headache Powders.
Thurston's Headache Powder.
Tousley's Catarrh Powder.
Truc's Headache Tablets.
Tubb's Cold & Grippe Tablets.
Tucker's Fever & Headache Powder.
Turkish Headache Powder.
Uncle Sam's Kola Headache Powder.
Van Marter's Headache Powder.
Vegelene Headache Tablets.
Vegeta Headache Powder.
Vick's "Kadok" Headache Powder.
V-O Headache Relief.
Walker's Headache Wafers.
Wall's (Dr.) Headache Powder.
Ward's Headache Powder.
Watkin's Headache Tablets.
Wayne's Headache Powder.
Webster's Headache Powder.
Weeks' Break Up a Cold Tablets.
Welling's Headache Cure.
Wheat's Headache Powders.
White Seal Headache Powder.
White & White Headache Powder.
Wing's Headache Specific.
Wischerth & Dogler's Headache Powder.
Wright's Paragon Tablets.
Wolf's Headache Cure.
Wood's Headache Tablets.
Wonder Cure Headache Powders.
X L Headache Wafers.
Yager's Handy Headache Tablets.
Yarnell's Columbian Headache Cure.
Young's Headache Powder.
Yu Kan Headache Powder.
Zeman's Headache Powders.
Zogat's Headache Powder.
Zerbst's Little Giant Headache Remedy.
Zerze's Positive Headache Cure.

FEMALE PILLS.

[By LYMAN F. KEBLER, M. D., Ph. D., Chief, Division of Drugs, U. S. Department of Agriculture.]

The publication of advertising matter inviting attention to means whereby conception can be prevented or abortion produced is specifically prohibited by law. Hence the manufacturers of drug products which are intended to be used for these purposes are careful not to state openly in their advertising literature the purposes for which their preparations are intended. They manage, however, to convey this information in such a way that those who are interested can readily understand. This is effected largely through the character of the name employed for the preparation, and through the agency of more or less guarded statements which appear upon the label or in the advertising literature. The name of most of these preparations are in themselves characteristic. They often contain the names of drugs which have come to be more or less widely known as emmenagogues or abortifacients, for example, "Pennyroyal Pills," "Tansy Pills," "Cotton-root Pills." Others are so worded as to be equally characteristic: "Female Regulating Pills," "Female Regulator," "French Pills," "Female Pills," etc. Each of these terms indicate more or less clearly the purpose for which the preparation is intended. In addition more or less guarded statements appear in the advertising literature. These preparations

are rarely recommended for the purpose mentioned above only, but are in most cases recommended for the cure of about all of the diseases to which the peculiar female organism is liable. Among these conditions, "Suppressed Menstruation" is given especial prominence. The following, taken from the advertising literature of some of the products in question, are given in illustration: "French Pills. Safe and Positively Infallible. Relieves Painful and Suppressed Menstruation," etc. * * *

Female Beans, Lion Drug Co., Buffalo.
Feminina, Mansfield Drug Co., Memphis.
Dr. Trousseau's Celebrated Female Cure, Dr. Trousseau Chemical Co., New York.
Female Pills, Arch Pharmacal Co., San Francisco.
Dr. Arthur's Pennyroyal & Tansy Pills, Palestine Drug Co., St. Louis.
Dr. Bane's Female Pills, A. V. Bane Medical Co., St. Joseph, Mo.
Dr. Cheeseman's Female Regulating Pills, Cheeseman Medicine Co., New York.
Chichester Pennyroyal Pills, Chichester Chemical Co., Philadelphia.
Fiske Clarke's Female Pills, Williams Mfg. Co., Cleveland.
Sir Clarke's Female Pills, Job Moses, 150 Nassau street, New York.
Dr. Constan's Female Pills, Fred'k K. Ingram & Co., Detroit.
Dr. Conte's Female Pills, Dr. Felix Conte, Paris.
Madam Dean's Female Pills, United Medical Co., Lancaster, Pa.
De Koven's Comp. Pennyroyal Pills, Crescent Chemical Co., Elmira, N. Y.
Dubois' Female Pills.
Du Choin's Female Pills.
Ducro's Female Pills, Dr. L. Ducro, Paris.
Duponco's Golden Female Pills.
Duquoi's Female Pills, Dr. Du Quoi, Paris.
Duquoin's Pennyroyal Pills.
Golden Female Pills.
Female Pills, Hillside Chemical Co., Newburgh, N. Y.
John Hooper's Female Pills.
Hooper's Green Seal Female Pills.
Job Moses' Female Pills, 10 Spruce street, and 150 Nassau street, New York.
King's Tansy Female Pills, King Medicine Co., Boston.
La Franco Female Pills, La Franco Medical Co., 145 North Eighth street, Philadelphia.
La Rues French Tabloids.
Lane's Female Pills, Allan Pfeiffer Chemical Co., St. Louis.
Leslie's Pennyroyal Pills, Arthur Chemical Co., St. Louis.
Lyon's Tansy Pills, Empire State Drug Co., Buffalo.
Mangogo Female Pills, New York & London Drug Co., New York.
Monell's Female Pills, C. E. Monell, New York.
Mott's Pennyroyal Pills, Williams Mfg. Co., Cleveland.
Olive Branch Female Pills, Olive Branch Remedy Co., South Bend.
Piso's Female Pills, The Piso Co., Warren, Va.
Red Cross Tansy Pills, Norman Lichty Mfg. Co., Des Moines.
Dr. Sanderson's Female Pills.
Female Pills, S. B. Medicine Mfg. Co., Portland, Oreg.
Seguro Compound, Seguro Mfg. Co., 531 K street, Sacramento.
Dr. J. Simms's Female Pills, J. H. Simms, Wilmington, Del.
Stearn's Tansy Pills, New York & London Drug Co., New York.
Dr. St. Jean's Female Pills, St. Jean Medical Co., 2004 Lexington avenue, New York.
Tansy Cotton Root Female Pills, New York & London Drug Co., New York.
Dr. Thomas's Pennyroyal Pills, Arthur Chemical Co., St. Louis.
Dr. Larue's Female Regulator.
Severa's Female Regulator, W. F. Severa Co., Cedar Rapids, Iowa.
Watkins' Female Remedy, J. R. Watkins Medical Co., Winona, Minn.
French, Antyseptin Female Remedy, Antyseptin Co., Gouverneur, N. Y.
Magnolia Blossoms, Female Suppositories, South Bend Remedy Co., South Bend, Ind.
Orange Blossom Female Suppositories, Dr. J. A. McGill Co., Chicago.

WASHINGTON, *June 15, 1908.*

Dr. GEORGE M. KOBER,
Chairman Committee on Social Betterment
of the President's Homes Commission.

DEAR DR. KOBER: While you verbally told me to "take my time," pressure of official duty has very much delayed formal reply to your letter, that the committee on social betterment of the President's Homes Commission is very anxious to determine as far as possible the causes of juvenile delinquency, wife desertion, and nonsupport, with special reference to standards of living, intemperance, and other faulty environments, and should be very glad to receive from me the results of my observation and experience.

Since there are many causes back of every act voluntarily elicited by the human will, it will be difficult to enumerate them all, even though the inquiry be limited, as you suggest, by special reference to standards of living. Yet certain broad conditions, rather than causes, may be indicated, improvement of which may be brought about by the exercise of the police powers of the state, in the interest of the general good of society, and consequently of the individual also; for, as the President has often reminded us, in the long run we are all going up or going down together.

Over twenty years' service as a volunteer helper of the unfortunate has, of course, given me some ideas relative to what the state might do to alleviate conditions, without destroying individual initiative. First, I was early impressed that homes in alleys foster vice and crime. Many citizens fear to enter the alleys even in daylight, the alleys are away or aside from the beaten lines of travel, and their isolation and comparative privacy encourage drunkenness and vagrancy and kindred evils, not only on the part of denizens, but on the part of outsiders glad to avail themselves of the cover of the alleys in their licentiousness. No more efficient work could be performed for social betterment in Washington than to absolutely abolish all human habitations in alleys. It is a service of such transcendent importance to the whole city that it would even be worth while for the whole city to bear the burden of purchasing these alley properties and changing these properties into interior parks.

Rents in the alleys range from $7.50 to $9 per month for four-room houses, without water in the house, though there may be water in the yard. The renters are drivers receiving from $5 to $7.50 per week as wages, or day laborers, receiving from $1 to $1.50 per day, or hod-carriers, who, when members of the union, receive $2.25 per day, otherwise less. Of course, these work people lose wet weather and are subject to other losses of time from different vicissitudes, such as waiting for building material. Sometimes the renter is a foreigner who is a skilled artisan or stone mason, drawing $4 per day, whose earnings suggest a better environment. When his children are brought into court, charged with shooting crap or other disorderly conduct, with the companions made in the alleys, he is brought to a realization that the child is more than the dollar, and readily agrees to get out of the alley into a home more suitable for an aspirant to American citizenship.

We have building regulations designed to secure the proper amount of air space for sleepers; yet several families will sometimes crowd into these small alley houses, and this is not the limit, for a lodger at 50 cents a week will often be accommodated upon the floor of the kitchen in addition. The family income is almost invariably increased by the laundry work done in these overcrowded tenements by the women occupants. Think of them, therefore, as nuclei for the spread of contagion. These alley women prefer to do laundry work at their homes in the alleys, where there is the least constraint and the most gossip.

Another serious evil is the commingling of the sexes. Children beyond the age of puberty are in the same room, often sleeping in the same bed. Sad are the results.

I endeavor in a familiar way to make these people appreciate the situation. In cases of overcrowding, they are reminded that they would not quarter cattle in such cramped shelter, for fear of breeding fever in the animals, and yet the human is infinitely more valuable. Where both sexes are occupying the same sleeping room, the mother or the father is asked if she or he would place in that room a lighted match near a can of gunpowder. Of course not, and they are shown the greater danger from mingling the sexes thus when the passions are strong and there is much ignorance, and they are reminded that under such conditions common decency becomes impossible. It is not unusual for married couples to have well-grown children sleeping in the same room

with them sometimes in the same bed. If the poverty be great, such are required to use at least cheap screens as an aid to decency. Sometimes a careful survey of the joint income of the members of the family demonstrates the ability to get additional room, or house space, especially if expenditures for vicious indulgences are cut out. And it is possible to get, even for the rents paid for alley houses, houses of similar size upon the streets of certain localities.

The facts herein referred to are brought out in the court hearings; but I early admonished the probation officers to make tactful inquiries along the same lines in their investigations, being careful, however, not to work at these people, but with them, in an endeavor to awaken ideals within the reach of the occupants of the houses in these hives of humanity.

The home conditions animadverted on give rise to drunkenness, breaches of the peace, wife desertion, and much of the juvenile delinquency. Out of the habitations of the drunkard or the father who does not provide for those of his own household, go children not with the innocence or the buoyancy of childhood, but children suffering the cravings of hunger and familiar with scenes of debauchery. To satisfy hunger, they must either beg or steal. Often, too, these children find in the tumult of the street, where no one nags them, surcease from the bickerings of the home. The street becomes their most prized rendezvous, to be preferred to the discipline of the school, and, therefore, herein arises much truancy, and hence arises much of the so-called wanderlust, to be prefixed to the quarrelsome home.

The nonsupport law is used to remedy these evils as far as practicable. The delinquent husband is made to go, on Saturday night, while he has his weekly wage in his pocket, to the nearest police station and pay there a stipulated amount to be turned over through the clerk of this court for the support of his wife or children, or both. Either drunkenness or infidelity is an incident in these nonsupport cases, and so a pledge is also exacted to refrain from the use of liquor for the space of a year, and to cut out entirely the illegal intimacy, a short instruction being given upon the venereal diseases following upon such wrongful indulgences.

During the first year of the operations of this court $6,060.59 were thus disbursed to needy families. In the eleven months of this fiscal year the amount was $19,285.86, in small sums weekly, from $1.50 up. There are now 286 families upon the relief roll at the court. This has saved a burden to the taxpayers, minimized drunkenness, and made lazy men work to support themselves and families. Some of these men have improved so in an economic sense that they have stated they were glad to have been brought into the court.

I may add that I wish you every success in your noble work for the betterment of conditions in the capital of our country, which I am proud to say is my own native city. President Roosevelt will ever be remembered as the President who sought to make this city the embodiment of the highest ideals of American life.

Sincerely, yours,

WM. H. DE LACY, *Judge.*

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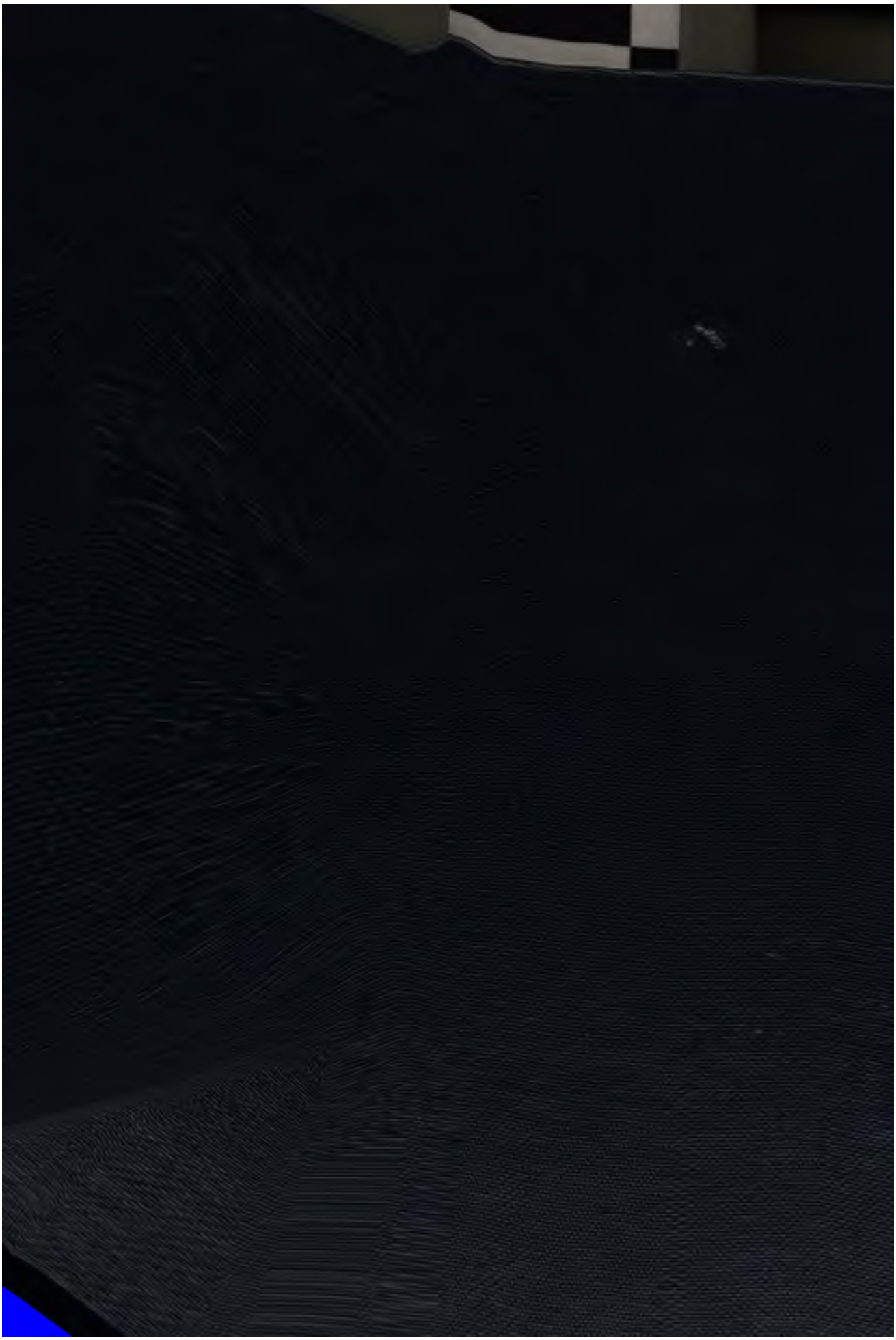
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